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Abstracts

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Monoclonal anti-DNA antibodies produce various types of glomerular immune deposits and induce different clinicopathologic syndromes. *D.V. Vlahakos, M.H. Foster, I. Vlachojannis, A. Ucci, and M.P. Madaio, Renal Division, Patra Univ. Hospital, Patra, Greece, and Depts of Med. and Pathol., New Engl. Med. Ctr Hosp., Boston, MA and Renal Electrolyte Section, U. Penn. School of Med. Philadelphia, PA, USA.* Nephritogenic immunoglobulins eluted from individuals with Systemic Lupus Erythematosus (SLE) cross-react with a variety of foreign and self-antigens, are predominantly IgG and fix complement. To further investigate the role of isotype, charge, V_h gene family usage and binding profile to the pathogenesis of nephritis, 6 monoclonal anti-DNA antibody-producing hybridomas (mAb) derived from MRL-lpr/lpr lupus-prone mice were selected and administered IP to normal mice. After a period of 2-3 weeks, all animals developed both ascites and/or tumors and serum anti-DNA activity. At that time, urine protein excretion was measured in 24 hours collections in metabolic cages, the animals were sacrificed and ascites, serum and tissues were collected for further analysis. The next table summarizes the in vitro findings of the anti-DNA mAb:

mAb	H73	H238	H161	H221	H147	H9
Ig	G_{2b}	M	G_3	G_{2a}	G_{2a}	G_{2a}
pI	7.8	7.5	9.0	5.1	8	8.8
$V_h$gene	J558	J558	J558	J558	81X	J558
a-ssDNA	2+	1+	2+	3+	3+	1+
a-dsDNA	2+	–	–	3+	2+	1+

Both the location of immune deposits and the morphologic and clinical expression of the ensuing disease varied with the administered mAb; normal appearance, no proteinuria despite elevated serum anti-DNA titers (H73); diffuse fine granular deposits, enlarged hypercellular glomeruli and proteinuria (H238); dense mesangial deposits with mesangial expansion and borderline proteinuria (H161); diffuse dense intraluminal and capillary wall deposits, aneurysmal dilatations of capillary loops, no hypercellularity and severe proteinuria (H221); granular mesangial and subendothelial deposits associated with proliferative glomerulonephritis, diffuse linear staining and proteinuria (H147); penetration into cells and nuclear staining, mesangial expansion with mild proliferation and proteinuria (Hg). These results suggest that dominant interactions between subsets of autoAb and renal antigen(s) rather than their physicochemical properties influence both the morphologic and clinical expression of disease.

Glomerular expression of transforming growth factor (TGF-ß) and platelet-derived growth factor (PDGF) in experimental anti-GBM disease. *E. Lianos, V. Orfanos, and N. Anagnou, Divisions of Nephrology and Molecular Biology. University of Crete, Greece.* The polypeptide growth factors TGF-ß and PDGF have been cloned and their glomerular expression has been described in experimental proliferative nephritis (J. Clin Invest 86: 453, 1990). A possible cellular origin is the elicited macrophage which infiltrates the glomerulus in proliferative forms of nephritis. This work assessed the glomerular gene expression of TGF-ß and PDGF in a macrophage-dependent (M-D) and a macrophage-independent (M-I) model of anti-GBM disease. Male Spruge-Dawley rats received either a single proteinuric dose of rabbit(Rb) anti-rat GBM Ig to induce MI anti-GBM disease, or were preimmunized with Rb IgG and subsequently received non-immune Rb IgG. Glomeruli were isolated on days 2,4,5,7 and 10 following administration of the anti-GBM IgG. Total glomerular RNA was isolated and hybridized with ^{32}P-labeled murine TGF-B PDGF cDNA probes [Sma-I 974bp in PGEM7Z(F^+) and Ava-I PGEM IIc-sis, respectively]. The intensity of hybridization bands was used as a reference to quantity expression of TGF-ß and PDGF mRNA. There was no difference in the levels of glomerular TGF-ß and PDGF mRNA were noted in the M-D model on days 5 and 7 respectively. At these points increased glomelural infiltration by Ia(+) macrophages was noted. We conclude that the elicited macrophage is a potential source of TGF-ß and PDGF in proliferative nephritis and may mediate proliferation in a paracrine manner.

Incidence of focal segmental glomerulosclerosis in adults with minimal change disease: The diagnostic value of repeat renal biopsy. *B. Margellos, Fl. Sotsiou, N. Nikolopoulou, Chr. Christodoulidou, Th. Apostolou, D. Georgakopoulou, M. Giamalis, and A. Billis, Division of Nephrology and Department of Pathology, Evangelismos Hospital, Athens, Greece.* According to the literature of the last decade, focal segmental glomerulosclerosis (FSGS) develops in a small proportion (0,5-5%) of patients (pts) with minimal change disease (MCD). However, this percentage may be considerably higher since the development of FSGS is frequently not diagnosed by renal biopsy. We studied the incidence of FSGS in 24 consecutive pts, 16 to 67 years old, who presented initially with idiopathic nephrotic syndrome, normal renal function and histologically confirmed MCD. Seven of these pts were submitted to repeat renal biopsy, 6 to 66 months after the first, because the nephrotic syndrome either did not respond to the sequential administration of steroids and cyclophosphamide (2 pts) or responded initially but relapsed frequently (5 pts). Four of the 7 pts presented also with progressive decline of their renal function. In all these four pts, the repeat biopsy disclosed FSGS (an incidence of 16,7% for all pts), while in the remaining three showed again MCD which was subsequently treated by a further course of cyclophosphamide (1 pt) or cyclosporine (1 pt). At the end of the follow-up period (13 to 141 months after the first biopsy and 7 to 66 months after the second), 3 of the 4 pts with FSGS were on chronic hemodialysis and the fourth had moderately severe chronic renal failure, while in the remaining three pts the nephrotic syndrome was in remission (complete in 1, partial in 2). In conclusion, in adult pts with MCD: 1) It seems that the incidence of FSGS is higher than that reported in the literature because it is frequently not diagnosed histologically. 2) The diagnosis of FSGS has important bearing on the prognosis and the management of the pts.

Treatment of nephrotic syndrome resistant to steroids with cyclosporin-A (CSA). *D. Grekas, H. Kalekou, P. Alivanis, L. Settas, C. Dioudis, and A. Tourkantonis, First Medical Department, Renal Unit, University Hospital AHEPA, Thessaloniki, Greece.* Twenty-two patients with nephrotic syndrome (NS) resistant to steroids, 13 with idiopathic NS (group A) and 9 with secondary NS (group B), aged from 19 to 56 years were included in this study. 5/13 patients of group A developed

on biopsy focal and segmental glomerulosclerosis (FSG), 4/13 minimal change disease (MCD) and 4/13 membranous nephropathy (MN). 7/9 patients with systemic lupus erythematosus, 1/9 with rheumatoid arthritis and 1/9 with Henoch-Schonlein purpura were included in group B. 3/9 patients of group B showed diffuse proliferative glomerulonephritis (DPGN), 2/9 focal glomerulonephritis (FGN), 3/9 MN and 1/11 renal amyloidosis (A). All patients received for 3-6 months 1-2 mg/kg body wt prednisolone alone or in combination with cyclophosphamide and they showed partial or no remission of the NS. CSA was given per os in the dosage of 6 mg/kg body wt for 3-6 months. Patients with MCD (group A) and DPGN (group B) showed full remission of the NS while the rest showed partial remission. Some patients with FSGN and MN showed also a slight deterioration of renal function. We conclude that the treatment of NS resistant to steroids with CSA is successful for patients with MCD and DPGN.

Cyclosporin and children with nephrotic syndrome (NS). *C. Stefanidis, A. Mitsioni, and K. Michelis, "A. and P. Kyriakou" Children's Hospital, Athens, Greece.* Corticosteroid administration is unsuccessful in a small percentage of children with NS and these patients (pts) require an alternative management. Cyclosporin (C) was given for 8-25 months in 11 children (5 with steroid dependent and 6 with steroid resistant NS) 2.3-12.6 years of age. The follow-up period was 1-4.6 years. 4 pts had minimal-change disease, 4 mesangioproliferative glomerulonephritis and 3 focal-segmental glomerulosclerosis. Pts received an initial dose of C 6 mg/kg/day, which was adjusted to maintain plasma levels between 100-500 ng/ml. All pts received prednisolone (1.2 mg/kg/day) progressively reduced to 0.3 mg/kg/day. 2/5 pts with steroid resistant NS had a significant decrease of proteinuria and 3 had a sustained remission. All pts with steroid dependent NS remained relapse-free while receiving full dose of C, however 4/6 relapsed when C was tapered. Nephrotoxicity was noticed in 4 children and hypertrichosis in 6. These side effects were reversed on withdraw of C. In conclusion cyclosporin was effective in children with NS. However in children with dependent NS the medicine in combination with low-dose steroids has to be administered for prolonged periods.

Sodium-lithium countertransport activity is related to deterioration of renal function in IgA nephropathy. *P. Kontessis, T. Tariq, R. Friedman, F. Moro, D.G. Williams, and G.C. Viberti, Unit for Metabolic Medicine and Renal Unit, Guy's Hospital, London, UK.* In IgA nephropathy renal function can remain stable or deteriorate progressively. Deterioration seems to occur in the patients with initially higher blood pressure (BP). An hyperactivity of the red blood cell sodium-lithium countertransport (NaLiCT) has been associated with the predisposition to essential hypertension. We measured NaLiCT in a group of 16 patients (13 M: 3 F), aged 21 to 60 years, with IgA nephropathy who successively attended the outpatient department of the Renal Unit over a 6-month period. The patients' records were reviewed for serial measurements of BP, 24-hours urinary protein excretion, glomerular filtration rate (51Cr-EDTA), creatinine, urea and electrolytes. Measurements of fructosamine ruled out diabetes mellitus. In a univariate analysis, NaLiCT was significantly correlated with the slope of GFR ($r = -0.63$, $p = 0.008$), as well as with systolic ($r = 0.68$, $p = 0.008$) and diastolic blood pressure ($r = 0.51$, $p = 0.06$) at diagnosis. A significant correlation was also found with current systolic ($r = 0.60$, $p = 0.022$), and diastolic ($r = 0.58$, $p = 0.031$) BP. In a stepwise multiple regression analysis with the rate of decline of GFR as the dependent variable, independent correlations were shown with NaLiCT ($p = 0.0026$), and current urinary protein excretion only ($p = 0.02$). Other variables such as initial and current GFR and systolic and diastolic blood pressure were not correlated with the slope of GFR. Our results suggest that the activity of NaLiCT, an indicator of risk for essential hypertension, is associated with the deterioration of renal function in IgA nephropathy.

Diagnostic significance of the detection of anti-neutrophil cytoplasmic antibodies (ANCA). *D. Hadjiyannakos, K. Terzoglou, M. Economou, N. Nikolopoulou, M. Maragou, P. Stavropoulos, Z. Rodoussaki, S. Athanasiadou, P. Dantis, and A. Billis, Dividions of Nephrology, Immunology and Histocompatibility, and Rheumatology, Evangelismos Hospital, Athens, Greece.* Although the presence of ANCA has been related to various autoimmune disorders, their diagnostic value is mainly limited to small vessel vasculitis, that is, microscopic polyarteritis (MP) and Wegener's granulomatosis (WG). We evaluated the clinical significance of these antibodies by examining the sera of 90 patients (pts) who were admitted to the hospital for systemic lupus erythematosus (26 pts, 9 with nephritis), MP with renal involvement (17 pts, 9 in the acute phase), primary and secondary glomerulonephritis (14 pts), rheumatoid arthritis (8 pts), hypersensitivity vasculitis (6 pts) WG (4 pts, 3 in the acute phase) and miscellaneous disorders (15 pts). In 60 pts, including all those with MP and WG, the diagnosis was confirmed by biopsy of an involved organ. As a control group were used 30 apparently healthy donors. The detection of ANCA was done by two techniques: a) by indirect immunofluorescence which identifies a cytoplasmic (c-ANCA) and a perinuclear (p-ANCA) pattern of fluorescence, b) by enzyme-linked immunosorbent assay (ELISA) using as antigens the proteinase-3 (PR 3) and the myeloperoxidase (MPO) of the neutrophils cytoplasm. Serum positive for ANCA, by one or both techniques, were found in 11 pts who were all in the acute phase of their illness (table).

	ANCA (+) patients	Immunofluorescence c-ANCA	Immunofluorescence p-ANCA	ELISA anti-PR3	ELISA anti-MPO
MP	9	2	5	2	7
WG	2	2	0	2	0

In the remaining 79 pts, as well as in the controls, the detection of ANCA was negative. These findings: 1) Confirm that ANCA are detected mainly in the acute phase of MP and WG, 2) Suggest that there is a positive correlation between p-ANCA and anti-MPO both of which are mainly found in MP.

Frequency and possible prognostic role of HLA antigens in microscopic polyarteritis (MP) with renal involvement. *D. Hadjiyannakos, M. Siakotos, H. Pappa, K. Tarassi, N. Nikolopoulou, S. Michael, Chr. Kaninis, Gr. Vosnides, Chr. Papasteriades, and A. Billis, Division of Nephrology and Laboratory of Immunology, Evangelismos Hospital, Division of Nephrology, Laiko Gen. Hospital, Athens, Greece.* The purpose of this work was to study the frequency of HLA antigens in patients with MP and renal involvement and to assess a possible role of HLA-antigens in susceptibility to or protection against the MP as well as to the outcome of the disease. Thus, the HLA-A,B and DR antigens were determined in 23 patients (10 males, 13 females) aged 30-77 years, presenting with MP and renal involvement, histologically confirmed. 405 apparently healthy individuals (190 males, 215 females), aged 18-65 years, were used as controls. The patients, compared to the controls, showed: 1) An inceased frequency of HLA-A10 (26% vs 11.3%, $p < 0.05$, Pc = NS, relative risk RR = 2.75), HLA-A11 (26% vs 9.6%, $p < 0.025$, Pc = NS, RR = 3.31) and HLA-DR5 (52.1% vs 36.4%, p = NS, RR = 1.90) antigens, and 2) a decreased frequency of HLA-DR3 antigen (4.3% vs 24.1%, $p < 0.025$, RR = 0.14). Six out of 7 patients who had not responded to the therapy and eventually died or were started on hemodialysis had the HLA-DR5 antigen. Our findings, although based on a small number of patients, indicate that: 1) There is no strong correlation between HLA antigens and the susceptibility to MP with renal involvement, 2) The presence of HLA-DR3 antigen may play a protective role against the disease, and 3) The presence of HLA-DR5 antigen may be considered as a bad prognostic index for the outcome of the disease.

Clinico-pathological evaluation of renal function after intravenous pulse cyclophosphamide in systemic lupus erythematosus (SLE). *D. Georgakopoulou, Fl. Sotsiou, N. Nikolopoulou, M. Maragou, Ch. Christodoulidou, D. Stavrianaki, P. Dantis, and A. Billis, Division of Nephrology, Rheumatology and Pathology, Evangelismos Hospital, Athens, Greece.* The therapeutic effect of intravenous pulse cyclophosphamide on the nephritis of SLE was prospectively studied in 10 patients (pts) (9 F, 1 M), 20 to 39 years old. Before treatment, 5 pts presented with nephrotic syndrome (NS) and 5 with asymptomatic proteinuria and/or microscopic haematuria. Five of 10 pts had also impaired renal function. The initial renal biopsy showed in 5 pts diffuse proliferative glomerulonephritis (GN), in 3 pts mixed lesions and in 2 pts sclerotic lesions. The cyclophosphamide was given intravenously in

monthly pulses (750 mg/m^2 of surface body area) for six months and subsequently in the same dosage 3-monthly. All pts also received prednisolone (0.5-1 mg/kg body wt daily) which, when their condition had been stabilized, was gradually reduced. In 2 pts with NS and impaired renal function cyclophosphamide treatment was discontinued after the first 3 months because of severe persistent leucopenia (1 pt) and refusal of treatment (1 pt). The remaining 8 pts continued their treatment for 24-36 months and then were submitted to a second renal biopsy. At the end of treatment, renal function has become normal or had been considerably improved in 3 of the 5 pts who completed their treatment, while the NS was in remission in 2 of the 3 treated pts. On the second renal biopsy, 4 of the 5 pts with diffuse proliferative GN (the fifth pt did not have a second biopsy) showed evolution of the histologic lesion to membranous (2 pts), focal proliferative (1 pt) and mesangioproliferative GN (1 pt) with a parallel decrease of the activity index of the disease from 12.5 to 3.5 (mean value), while the chronicity index remained unchanged. The only significant side-effect of cyclophosphamide was the persistent leucopenia in 1 pt which led to discontinuation of treatment. In conclusion, intravenous pulse administration of cyclophosphamide in our pts improved considerably both their renal function and the pattern of glomerular histological lesions of SLE.

The effect of an acute oral protein load on urinary albumine excretion in subjects with a solitary kidney. *N. Papagalanis, M. Gennadiu, A. Karabatsos, K. Fainekos, M. Elisaf, A. Kourti, A. Zacharof, K. Siamopoulos, and Th. Mountokalakis, Department of Nephrology Red Cross Hospital of Athens, Athens, Greece, Department of Endocrinology Red Cross Hospital of Athens, Athens, Greece, Department of Indernal Medicine University of Ioannina, Ioannina, Greece, Department of Indernal Medicine University of Athens, Athens, Greece.* The effect of an acute oral protein load (OPL) of 150 g on urinary albumine excretion (UAE) was determined in 29 subjects (PTS) aged 22-75 years (mean 54.14) with negative albustix tested urines who had undergone unilateral nephrectomy 15 days to 52 years ago (96.9 ± 145.5 months) and in 16 normal volunteers (CTR) aged 25-55 years (mean 47.7). Patients with one kidney for more than 10 years (9 PTS aged 58.38 ± 3.23 years with a mean time after nephrectomy 282.75 ± 58.34 months-PTS I) had lower creatinine clearance (C_{Cr}) and higher mean blood pressure (MBP) compared with either the PTS with one kidney for less than 10 years (21 PTS aged 52.53 ± 2.9 years with a mean time after nephrectomy 26.1 ± 7.9 months-PTS II) or the CTR (C_{Cr} values: 51.75 ± 5.8, 74.48 ± 4.9 and 100.33 ± 7.5 ml/min/1.73 m^2, p = 0.0007, for PTS I, PTS II and CTR respectively. MBP values: 102.5 ± 3.6, 95.82 ± 3.0, and 86.8 ± 2.6 mm Hg, p = 0.03, for PTS I, PTS II and CTR respectively). UAE was higher in PTS I compared with either PTS II or CTR at both the basal state (26.5 ± 5.0, 11.4 ± 1.7 and 9.4 ± 2.0 μg/min, p = 0.0005, for PTS I, PTS II and CTR respectively) and after OPL (29.0 ± 5,0, 13.1 ± 1,8, and 10.8 ± 2.4 μg/min, p = 0.0005, for PTS I, PTS II and CTR respectively). However, the magnitude of postpradial increase in UAE was significant (p = 0.009) in PTS II only. An exponentialy negative correlation between UAE and C_{Cr} (r = −0.55, p = 0.002) and an exponentialy too but positive correlation between UAE and the time since nephrectomy (r = 0.65, p = 0.0001) was apparent in the total population of PTS studied. Serum creatinine was higher in PTS I compared with PTS II and with CTR at either the basal state (126.0 ± 17.0, 93.9 ± 6.0, and 80.5 ± 5.0 μmol/liter, p = 0.01, for PTS I, PTS II and CTR respectively) or after OPL (143 ± 17.7, 124.8 ± 8.0 and 113.0 ± 8.3 μmol/liter, p = 0.05, for PTS I, PTS II and CTR respectively), however the increase in serum creatinine after OPL was significant in either PTS I (p = 0.02), PTS II (p = 0.003), and CTR (p = 0.006). Urinary creatine was lower in both PTS I and PTS II compared with CTR at the basal state (7.5 ± 1.6, 8.2 ± 0.7, and 15.2 ± 4.0 μmol/min, p = 0.01 for PTS I, PTS II and CTR respectively); however urinary creatinine was increased (to 10.3 ± 1.0, p = 0.02, and to 17,1 ± 3.0 in PTS II and CTR respectively) in PTS II and in CTR while it was reduced to 4.8 ± 1.0 μmol/min in PTS I after OPL. Fractional excretion of sodium was higher in PTS I compared with either PTS II or CTR both at the basal state (11.4 ± 2.0, 10.0 ± 1.2, and 4.6 ± 0.4%, p = 0.1, for PTS I, PTS II and CTR respectively) and after OPL (14.1 ± 4.1, 10.1 ± 1.5, and 4.8 ± 0.7%, p = 0.008, for PTS I, PTS II, and CTR respectively). Urine volume was not different between the three groups at the basal state but it was reduced after the OPL (from 1.1 ± 0.6 to 0.63 ml/min, p = 0.05) in PTS I only. The reciprocal of serum creatinine (SCr^{-1}) was negatively, exponentialy, correlated to the time since nephrectomy in the total population of PTS studied, (r = −0.43, p = 0.02), this correlation was positive (r = 0.7, p = 0.0004) in PTS II and negative (r = −0.8, p = 0.01) in PTS I. Multiple regression analysis revealed that this relationship of SCr^{-1} with the duration of uninephric state (p = 0.004) was indepentent from age (p = 0.7) or MBP (p = 0.5) in PTS II. However, by steped selection of variables, MBP appeared to be a significant factor determining the rate of decline of renal function in PTS I (p = 0.01). These results indicate that the UAE after an extremely high OPL increases in uninephric subjects who are in the first decade after nephrectomy, and have C_{Cr} values higher than 50% of normal. They also suggest that uninephric subjects are in increased risk for developing renal insufficiency after 10 years of nephrectomy, due to hyperfiltration present during the early years after nephrectomy.

An intelligent computer-based system for the diagnosis and management of the acute renal failure. *S. Markou, A. Diamantopoulos, D. Skarpetas, A. Kosmopoulos, D. Karayianis, and A. Doulis, Department of Nephrology, General Hospital of Patras "Agios Andreas", Patras, Greece.* Acute renal failure can arise from a multitude of causes. With few clinical clues, physicians must recognize the common settings in which acute renal failure develops and must order appropriate tests promptly. We developed a software, capable to provide significant diagnostic and therapeutic problem-solving assistance, in the case of a patient with acute renal failure, to the practicing physician. We used as the basis for our software an event-driven, message-based language with object-oriented features, which operates with a Graphics User Interface (Windows 3.0). This computer program has windows, icons, pull-down menus, buttons, dialog boxes, crisp test and standout graphics. It's able to work equally well with either a keyboard or mouse and take advantage of the power hypertext technology. This software designed for using by the non-expert, which has a role in the management of acute renal failure, demonstrated also the potential power of hypertext and multimedia concepts in electronic medical publishing. Finally, as an intelligent tool helps any physician, which is a novice programmer, to become productive, by interfering with the knowledge base of the acute renal failure.

Neuroleptic malignity syndrome (NMS) and acute renal failure (Description of a rare case). *P. Evangelou, Ch. Katsinas, *G. Voulgaridis, H. Giousef, K. Ntaitzikis, and K. Hatzikonstantinou, Renal Department of General Hospital of Veroia, *Psychiatric Department of General Hospital of Veroia. Veroia, Greece.* The NMS was firstly described by Delay and Denicker in 1968. The cause of the NMS are considered to be the providing of neuroleptics or the abrupt pause of antiparkinson drugs. The typical presentation of patients with this syndrome is: high temperature, generalised rigidity, tachypnea, tachycardia, hypertension, sedation, disorder of concience-coma, and is confirmed by laboratory findings as: increasement of CPK, LDH, SGOT, SGPT and leucocytosis with dominance of the polymorphonuclears. A 57-year-old man with an 8 years history of schizoaffective disorder treated with neuroleptics, antidepressives and sometimes antiparkinsonic drugs, was admitted in our department. 7 days ago he has been hospitalised in a psychiatric clinic for a relapse of his disease. At the moment of his arrival he presented anuria by 4 days and the clinical and laboratory examinations revealed: arterial pressure 180/110 mmHg, 110 pulses/min, fever 38,5° C, urea 390 mg%, creatinine 17.7 mg%, Ca 6,4 mg%, P 9.4 mg%, K 6.2 mEq/liter, Na 129 mEq/liter, CPK 2134 U/liter, LDH 554 U/liter, SGOT 109 U/liter, SGPT 112 U/liter, ac. uric 14.3 mg% and leucocytes 13600/mm^3 with polymorphonuclears 81%. From his history and the laboratory findings we put the diagnosis of NMS. We stopped previous therapy, we applied extrarenal support and pharmaceutical therapy with diazepam. Despite the fact that the diuresis was restored and the therapy with haemodialysis was effective the patient died after 7 days without acquiring his concience. This case is presented because is rare, only six cases have been described in Greek literature, and our case is the only one presented with acute renal failure requiring haemodialysis.

Life-threatening hyperkalemia: risk factors and prognosis. *S. Antoniou, N. Hatzisavvas, G. Kyriazopoulos, S. Tourtouris, and A. Dimitriadis, 1st Dept. Int. Medicine, Ag. Dimitrios Hospital, Thessaloniki, Greece.* Increased incidence of hyporeninemic hypoaldosteronism (old age, DM, etc.) and vast use of drugs affecting the renin-aldosteron system, may influence the spectrum of risk factors, as well as, the prognosis of hyperkalemia (HyperK). Thirty four patients (1.2% of the admitted 21o, 13o) with HyperK (K: 6.5-10.0 mEq/liter), mean age 71 ys (range 39-92, 73.5% > 65) were studied. Renal failure (24 CRF, 6 ARF), acidosis (17/26 with pH < 7.35), D. Melitus (15) and drugs such as CEI (12), amiloride (4), spironolactone (4), were stated as causative factors for HyperK. Possibly digitalis and other drugs contributed. K levels were correlated with pH ($r = -0.406$, $p = 0.39$) and HCO3 ($r = -0.399$, $p = 0.044$). Intensive treatment (5 with peritoneal dialysis) reduced K from 7.29 ± 0.86 to 6.01 ± 0.86 ($p < 0.044$) in 3-24 hours. Only 2 out of 8 deaths were due to HyperK. Elderly with mild CRF are prone to life-threatening HyperK, mainly when acidosis and/or DM are present, while consumption of multiple drugs may contribute. Intensive treatment can reduce morbidity. Final prognosis is influenced mainly by underlying diseases.

Long acting antihypertensive agents. *P. Koureta, F. Ageleli, A. Kotsianis, et al, Panarcadian General Hospital, Department of Nephrology, Tripolis, Greece.* Antihypertensive activity and side effects of Perindopril (P) and Nitrendipine (N) were evaluated in a total of 73 patients with mild, moderate or severe hypertension for a period of 3-20 months. Fifty-two patients (29 men, 23 women; 28-67 years; mean 54.2) were treated with the ACE inhibitor P; mean daily dose 5.4 mg once daily. In 34 of them (65%) a diuretic was also necessary. In two patients an allergic reaction stopped the treatment. Twenty one patients (13 men, 8 women; 48-81 years; mean 63.2) were treated with calcium entry blocker N; mean dose 25 mg once daily. In 8 patients diuretics were also added in the treatment. Three patients had headaches and one oedema of the lower exremities. The mean blood pressure of all the hypertensives was 172/106 mmHg (±17,3/8 SD) before treatment and 138/87 mmHg (±18,6/7 SD) 2 months later. No pathological laboratory data were registered. Five patients denied compliance. Our data indicate that P and N are effective and safe agents with good response after 20 months and good compliance because of the convinient once daily dose.

Relationship between metal ions Ca^{++} Mg^{++} K^{+} Na^{+} during the sudden changes of arterial pressure (AP) in man. *Th. Galeas*, D. Mylonas*, S. Mylonas*, Hr. Bardas*, N. Tsianas**, and M. Lemoni***, B'* Internal Medicine Clinic*, Artificial Kidney Unit**, Microbiology Dept***, Trikala General Hospital, Greece. The purpose of the work was to study the metal ions Ca^{++} Mg^{++} K^{+} and Na^{+} during the sudden changes of AP. Material of the study were 27 renal patients in the artificial kidney unit, 17 males, 10 females, mean age 54.74 ± 11.73. The 6 month study included three stages. In the first stage, in a state of relaxation, the AP of all patients was measured. In the second and third stages AP of the patients who manifested signs of sudden elevation or fall of AP without medical or any other intervention during hemodialysis was also measured. In all three stages measurement of blood ions followed. Paired t-test method was used for the analysis of the results.

Total number of examined (27)	serum(mmol/l) Ca^{++}±SD	serum(mmol/l) Mg^{++}±SD	serum(meq/l) K^{+}±SD	serum(meq/l) Na^{+}±SD
1. Relaxation (normal rates)	1.14 ± 0.15 1.14-1.30	1.02± 0.1 1.02-1.05	5.46 ± 0.71 3.5-5	141.7 ± 4.03 135-145
2. Sudden elevation of AP	1.30 ± 0.15 t = 4.92	1.0± 0.88 t = 2.81	5.5 ± 1.00 t = 6.82	145.33 ± 3.31 t = 2.07
3. Sudden fall of AP	1.27 ± 0.24 t = 2.22	0.82± 0.13 t = 3.82	3.5 ± 0.29 t = 6.15	134.4 ± 1.51 t = 2.01
	NS	p < 0.05	p < 0.01	NS

In conclusion: 1) The sudden elevation or fall of AP during hemodialysis showed a relation with the changes of Ca^{++} Mg^{++} K^{+} concentrations and seems to be independent of Na^{+} concentrations 2) It can be said that metal ions Ca^{++} Mg^{++} K^{+} and Na^{+} should also be examined as possible regulators of AP.

Serum fructosamine (SF) measurement in diabetic patients on chronic haemodialysis (HD). *D. Arvanitis, P.S. Kontessis, E. Iliopoulou, P. Parigori, E. Georgoussi, and I. Bossinakou-Papathanassiou, Renal Units, Amalia Fleming and Alexandra Hospitals, Haematological Laboratory, Hippokration Hospital, Athens, Creece.* Glycosylated haemoglobin (HbA_1) levels in diabetic patients on HD have been claimed to be affected by anaemia and urea metabolic products. Serum fructosamine (SF) measurements could therefore be a better indicator of glycaemic control. We have studied SF, HbA_1, blood glucose, serum protein, blood urea and creatinine in 15 non-diabetic and 11 diabetic patients on HD. Blood samples were taken before and after HD for 4 consequent weeks. Group of 13 healthy volunteers has been used as control. Overall SF and HbA_1 concentrations were significantly higher in diabetics than in non-diabetic renal patients (4.5 ± 0.30 vs 2.5 ± 0.1, $p < 0.001$ and 11.50 ± 0.44 vs 7.5 ± 0.22%, $p < 0.001$ respectively). HbA_1 concentration was higher in non-diabetics on HD compared to the control group (7.56 ± 0.22 vs 6.5 ± 0.14%, $p < 0.001$). SF correlated well with the mean blood glucose levels determined 1 and 2 weeks before ($r = 0.708$, $p < 0.01$) in diabetics on HD but not in non-diabetics on HD. HbA_1 was not correlated to antecedent blood glucose in any group. Multiple regression analysis revealed that SF had a better correlation with the antecedent blood glucose. No changes in SF and HbA_1 levels have been shown post-dialysis. Our results suggest that serum fructosamine measurement provides reliable information on a short-term glycaemic condition in diabetic patients on HD.

Nutritional status, apolipoprotein levels and lipoprotein Lp (a) in diabetics on chronic haemodialysis (HD). *P.S. Kontessis, M. Panayotou, I. Bossinakou, N. Papageorgakis, A. Melpidou, D. Roussi, I. Grapsa, E. Georgoussi, and N. Zerefos, Renal Unit, Alexandra Hospital, Haemotological Lab., Hippokration Hospital and Biochemical Lab., Evangelismos Hospital, Athens, Greece.* Malnutrition has been reported in uremic patients undergoing HD. Nutritional assessment has not been clearly defined in diabetic (D) patients on HD. The nutritional status of 14 D patients (10 males, 4 females) on HD was compared to a group of 17 non-diabetic (ND) patients (11 males, 6 females) well matched for age and duration of HD. Anthropometric measurements (body mass index BMI, arm circumference AC) were made using standard techniques and diet was assessed by three-day dietetic diary. Protein intake was higher in D than in ND patients on HD (1.16 ± 0.1 vs 0.87 ± 0.07 g/kg/day; $p < 0.01$) while caloric intake was not different (23.9 ± 1.9 vs 23.4 ± 1.6 Kcal/Kg/day). Haematocrit (28.5 ± 0.66 vs 31.2 ± 1.5%; $p < 0.01$) and vitamin B_{12} (824 ± 88 vs 1636 ± 126 pg/ml; $p < 0.05$) were lower in D patients. Apo A-I was lower in diabetics (13.8 ± 11.1 vs 154.6 ± 5.8 mg/dl; $p < 0.05$). BUN, serum creatinine, serum albumin, folic acid, ferritin, transferrin, C_3 and C_4 were similar in both groups. Turberculin test was negative in 54% of D and 59% of ND patients. Metrices of coefficient correlation revealed that BMI was correlated with plasma carnitine levels ($r = 0.86$, $p < 0.01$) and phosphate ($r = 0.91$, $p < 0.01$) in D patients. Stepwise multiple regression analysis with plasma carnitine and transferrin as dependent variables showed correlations with BMI ($p < 0.01$) and AC ($p < 0.05$). Neither nutritional intake nor anthropometric measurements were correlated with the duration of HD. Conclusions: 1) Diabetics of HD are in better nutritional status compared to the non-diabetics. 2) Plasma carnitine and transferrin are predictors of nutritional status in diabetics on HD.

The importance of aminoacids in the cognitive function in regular haemodialysis patients. *D. Kabadias, S. Pelidou, M. Dima, K. Barboutis, and A. Belogiannis, Hemodialysis Unit and Neurological Clinic, General Hospital of Serres, Greece.* It is well known that the pathogenesis of disequilibrium syndrome, in chronic haemodialysed patients is related to many factors, as electrolyte disturbances, acute changes at the blood levels of urea and creatinine, disturbances of the pH, haemodynamic changes, aminoacid losses etc. The clinical manifestations of this syndrome are related mainly to disturbances of the cerebral function. In an effort to study the beneficial effect of i.v. infusions of aminoacids for prevention from the occurrence of the dis-

equilibrium syndrome, we studied 11 patients with mean age 69 years, who were on a program of chronic haemodialysis with acetate for 6 to 132 months. Each patient was assessed 5 minutes before and after each HD session (with acetate or with acetate plus a solution of aminoacids and sorbitol) by EEG, neuropsychological sceening (MMSE) and clinical neurological examination. After the HD with acetate plus aminoacids 46.6% of the EEGs improved, 18.2% deteriorated and 36.3% remained unchanged. The neurophychological screening showed: 63.6% improvement, 18.2% deterioration and 18.2% without any change. Contrary to this after the acetate HD none EEG improved, 72.7% deteriorated and 27.3% remained unchanged; at the same time by neurophychological screening we had 36.4% with improvement, 63.6% with deterioration and none without any change. The clinical neurological assessement showed no signifficant change with both methods. In conclusion it appears that the i.v. infusion of aminoacids at the end of the HD with acetate prevented significantly the appearence of the disequilibrium syndrome.

Pre-operative localization of the parathyroid glands. A comparison of ultrasound and operative findings. *G. Zavos, A. Kostakis, K. Revenas, St. Kyriakidis, B. Apostolopoulos, E. Koulentianos, P. Giagow, E. Misiakos, and Gr. Vosnides, Transplantation Center, Laïkon General Hospital, Athens, Greece.* The pre-operative localization of the parathyroid glands, can be of significant help to the surgeon. Fifty two, of 123 pts who underwent parathyroidectomy in our unit between Jan. '89 and October '91, were submitted to preoperative ultrasound examination of the neck. This examination was performed by the same radiologist and its findings were compared to the operative ones. Ultrasonographically, 4,3,2,1 and no glands were visualized in 12 (24.5%), 7 (14.3%), 16 (32.7%), 10 (20.4%) and 4 (8.2%) pts respectively. In each of the 2 pts with the recurrence of the disease 1 gland, was visualized while in the third pt a false positive result was observed. In five pts totally a false positive visualization of glands was observed. During surgical exploration 4,3,2,1 and no glands were located in 38 (77.5%), 8 (16.3%), 3 (6.2%), 2 and 1 pt respectively. Totally, of the 184 surgically recognized glands, 113 (61.4%) were located ultrasonographically. The ultrasonographic localization of the glands was mainly related to their position and size. It is conluded that pre-operative ultrasonographic examination of the neck, when done by experienced hands, provides substantial help to the surgeon. However, thorough knowledge of the anatomy of the region is of the outmost importance.

Effect of parathyroid hormone and 1,25(OH)2D3 administration on T-lymphocytes and their expression of interleukin-2 in hemodialysed patients. *Ch. Stathakis, M. Choremi, J. Boletis, A. Iniotaki, B. Viglis, A. Lambropoulou, D. Stamatiades, A. Kostakis and Gr. Vosnides, Division of Nephrology and Transplantation, Immunology Dpt Laikon General Hospital, Athens, Greece.* The purpose of this study was the in vivo investigation of the in vitro findings that parathyroid hormone (PTH) and 1,25(OH)2D3 are immunomodulators. T-cellular immunity was evaluated in 9 adults on regular hemodialysis (HD) who underwent parathyroidectomy (PTX) due to secondary hyperparathyroidism. PTH levels were determined with RIA and T-cell subsets (CD3, CD4, CD8), as well as the expression of interleukin – 2 receptors on CD4 and CD8 (IL-2R/CD4, IL-2R/CD8) were determined by monoclonal antibodies (Becton Dickinson) and flow cytometry, before, 8 days and 38 days after PTX. Administration of 1,25(OH)2D3 (0.5 μg/d, per os) was initiated on the 8th post PTX day. Nine normal volunteers age and sex matched were used as controls. Our results showed that 1) there were no differences regarding CD3, CD4, CD8 and CD4/CD8 between controls and HD pts before PTX. 2) On the 8th post-PTX day, CD3 values were higher than pre-PTX ($p = 0.02$), CD4 higher than pre-PTX and controls ($p = 0.03$). 3) After administration of 1,25(OH)2D3 for 30 days (38th post-PTX day) CD3 and CD4 remained unchanged compared to the 8th post-PTX day, while CD8 were reduced and CD4/CD8 ratio significantly increased compared to pre-PTX ($p = 0.005$) the 8th post-PTX day ($p < 0.05$) and controls ($p = 0.007$). 4) IL-2R/CD4 and IL-2R/CD8: a) were significantly higher in HD pts, prior to, on the 8th and 38th post-PTX day than in controls ($p < 0.03$). b) on the 8th post-PTX day IL-2R/CD4 and IL-2R/CD8 were higher than pre-PTX. c) on the 38th post-PTX day both IL-2R/CD4 and IL-2R/CD8 decreased compared to the 8th post-PTX day ($p = 0.04$, $p = 0.03$ respectively). Our results indicate that in HD pts, different levels of PTH and 1,25(OH)2D3 administration affect T-cell subsets and IL-2R expression on CD4 and CD8.

Serum procollagen type-I as biological parameter of bone metabolism in hemodialysis-preliminary results. *G.E. Digenis, M. Christophoraki, A. Papantoniou, M. Mavrikakis, V. Papantoniou, E. Samuilidi, N. Zerefos, and S. Moulopoulos, Hemodialysis Unit, Therapeutic Clinic, Athens Medicine School, Biochemistry and Radio-isotope sections of "Alexandra" Hospital, Athens, Greece.* The polypeptide procollagen type-I (Proc-I) is a precursor of collagen type-I which accounts for more than 90% of bone organic matrix. In order to evaluate this parameter in hemodialysis (HD), sera from 12 HD pts (10 males and 2 females, aged 53 ± 5.4 yrs, $\bar{x}$ ± SEM) who were dialysed for 62 ± 12 months, were examined in comparison to 11 matched controls. With the exception of phopshate binders, no medication was taken by the patients for at least 2 weeks. None suffered from liver disease. Proc-I, along with serum calcium, phosphate, alkaline phosphatase, total protein, albumin and intact PTH, were determined at the beginning, 90′ and the end of dialysis. Serum Proc-I levels were significantly higher in dialysed pts (188 ± 17 vs 85 ± 13 μg/liter of controls) and there was a positive linear correlation between Proc-I and serum PTH levels (N:36, r:0.445, $p < 0.01$). Moreover, there was a progressive decrease in serum Proc-I levels during dialysis session. As a result, Proc-I was significantly lower at the end of dialysis ($p < 0.01$). It is concluded that the high levels of Proc-I in dialysis pts are positively correlated with serum PTH. Hemodialysis decreases serum Proc-I levels by an unknown mechanism which needs further study.

Evaluation of renal osteodystrophy (ROD) with calcium kinetic studies. *P. Kurz, T. Tsobanelis, P. Roth, E. Werner, +J. Vlachojannis, *H. Malluche, and P. Grützmacker, II. Med. Klinik, St. Markus Hospital and GSF, Frankfurt/M, Germany, *Univ. of Kentucky, Lexington, USA, +Rion Univ., Patras, Greece.* The manifestation of uremic bone disease in not uniform and differences in calcium (Ca) metabolism may be associated with the histological patterns observed. We studied 43 pts on maintenance dialysis treatment with biochemical, histological and Ca-kinetic parameters. A double isotope technique (^{45}Ca and ^{47}Ca) was used to measure intestinal Ca absorption, plasma Ca efflux (pCa-eff) and Ca retention (Ca-ret) in bone after 28 days. All parameters were correlated with the biochemical and histological data. Seven pts had a high turnover (HTO), 16 a low turnover osteopathy (LTO) and 20 a mixed type (MUO) of ROD. Pts with LTO had lower serum PTH levels and lower pCa-eff values ($p < 0.001$). Ca-ret was low compared to the MUO and HTO group (19.2 vs 37.1 and 72.2%, respectively). pCa-eff and Ca-ret correlated positively with PTH ($r = 0.7$ and $r = 0.8$, respectively) and histological signs of bone turnover (no of osteoblasts and -clasts, osteoid volume etc). pCa-eff together with serum PTH level allowed in 37/43 pts a correct estimation of bone turnover. Ca-kinetic studies are a valuable tool to examine the disturbed Ca metabolism in ROD and may be used in measuring the response to treatment. In addition a low pCa-eff and Ca-ret explain the tendency for the development of hypercalcemia in pts with LTO.

Calcitriol for the treatment of renal osteodystrophy in patients with mild and moderate chronic renal faillure (CRF). *J. Malegos, A. Gerakis, Th. Apostolou, G. Metaxatos, Ch. Christodoulidou, M. Giamalis, M. Siakotos, and A. Billis, Division of Nephrology, Evangelismos Hospital, Athens, Greece.* The therapeutic effect of Vit. D in renal osteodystrophy (RO) was prospectively studied in 10 patients (pts) (4 M, 6 F) 38 to 66 years old, with CRF (serum creatinine 2-6 mg%, creatinine clearance 20-50 ml/min) (Group A) who were treated with calcitriol 0,25-0,5 μg daily for 12-14 months. As a control group were used 10 pts matched for age, renal function and known duration of CRF with those of group A. At the beginning and the end of the study period, the biochemical and hormonal parameters of RO were measured and bone biopsies were performed in all pts. At the beginning there were no statistically significant differences in the biochemical, hormonal and histological findings between the two groups. Histomorphometrically, in group A 6 pts had secondary hyperparathyroidism (SHPT), 3 pts mixed bone disease and 1 pt normal bone, while in group B 6 pts had SHPT, 1 pt mixed bone disease and 1 pt normal bone. At the end of the study, the pts of group A in relation to those of the control group, showed an increase in serum calcium and

25(OH)D3; a fall in their serum parathormone, alkaline phosphatase and osteocalcin; an increase in the mineralization front; and a decrease in the number of osteoclasts. All these changes were statistically significant at p = 0.05. Histomorphometrically, 7 of the pts who received treatment showed SHPT and the remaining 3 normal bone, while in the control group all pts had lesions of either SHPT (8) or mixed bone disease (2). The deterioration of renal function was similar in both groups. In conclusion, in pts with mild and moderate CRF calcitriol improves the biochemical, hormonal and histological parameters of RO without undue deterioration of renal function.

The influence of the intravenous administration of hydroxyvitamin D3 on the renal osteodystrophy of dialyzed patients. *A. Triantaphyllidou, P. Bekiarides, N. Evangellopoulos, and A.A. Diamantopoulos, Renal Unit, St. Andrews State Hospital and Diagnostic Center "B-Diagnosis", Patras, Greece.* In order to investigate the action of the intravenous administration of 1-a hydroxyvitamin D3 on renal osteodystrophy due to secondary hyperparathyroidism, we undertook the present study. Five patients (three males and two females), with an average age of 55.3 ± 3.1 years, were included in the study. They were dialyzed in our unit for 12 hours weekly using a couprophan dialyzer, and with a calcium bath consentration of 1.67 mml/liter. Before starting treatment, we checked the serum levels of calcium, aluminium, phosphate, alkaline phosphatase and PTH. The bone density and the calcium bone concentration were examined using the method of double photon absorbtion. Afterwards 1 μgr of 1 – a hydroxivitamin D3 (Leo), was administered intravenously, thrice a week, at the end of each dialysis session. The treatment lasted for two months at the end of which all the above mentioned tests were repeated. There was a statistically significant increase ($p < 0.01$), of the serum calcium by using the paired t-test. However using the same statistical method no improvement was found either of the abnormally high PTH levels, or of the mean bone density and the mean calcium bone concentration, with the double photon absorbtion method. We conclude that there was only an improvement of the serum calcium level, but not any difference of the very sensitive radioisotopic method, at least when using these very low 1 – a doses.

A comparative study of renal osteodystrophy in patients undergoing hemodialysis (HD) and continuous ambulatory peritoneal dialysis (CAPD). *Th. Apostolou, A. Gerakis, M. Siakotos, G. Metaxatos, J. Malegos, N. Nikolopoulou, D. Hadjiyannakos, N. Toupadaki, and A. Billis, Division of Nephrology, Evangelismos Hospital and Department of Hygiene and Epidemiology, University of Athens, Greece.* The main parameters of renal osteodystrophy were studied in 28 patients (pts) undergoing HD and in 18 pts undergoing CAPD. The two groups were comparable in sex, age, known duration of the chronic renal failure before starting HD or CAPD and duration of dialysis treatment which was in all pts greater than 12 months. None of the pts had been submitted to parathyroidectomy or renal transplantation, had been treated with vitamin D, desferioxamine, steroids or anti-convulsant drugs, or had changed the initial technique of dialysis. The study protocol included clinical examination and laboratory assessment of the pts (biochemical, hormonal, radiological, ultrasound of parathyroids and bone biopsy). Statistical analysis of the data showed that the pts undergoing HD, compared to those who were on CAPD, developed more frequently pruritus ($p = 0.04$) and radiological findings of secondary hyperparathyroidism ($p = 0.03$), had higher values of serum Ca and P ($p = 0.05$ and 0.04, respectively), and histologically presented a higher bone appositional rate ($p = 0.05$) and a heavier aluminium deposition in bone ($p = 0.003$). Although there was not a statistically significant difference between the two groups of pts regarding the histological type of renal osteodystrophy, there was a tendency for the development of secondary hyperparathyroidism among the pts who were on HD. In conclusion, our HD pts disclosed more frequently than those who were on CAPD biochemical, radiological and histological findings of secondary hyperparathyroidism along with a heavier aluminium deposition in bone.

The combination of Hemoperfusion – Hemodialysis (HP-HD) with use of desferioxamine (DFO) in aluminium (AL) removal. *K. Platsakis, S. Giannakakis, I. Stavroulakis, A. Koroneos, and N. Papadodimas, Nephrology Department, Tzanion General Hospital, Piraeus, Greece.* Aluminium accumulation in ESRD patients is responsible for many clinical symptoms. The limited adequacy of HD for its removal is well known. Four male HD patients aged 47-70, with treatment duration 77.7 ± 32.8 months, having the highest initial serum AL levels, were selected for study. They were infused with 1g DFO IV and serum AL levels were measured 44 hours later. A three hour session of combined HP-HD followed with blood flow 250 ml/min. Aluminium clearance of the whole system and each filter separately was measured, at 15′ and 180′ from the beginning of the session. AL removal per patient was estimated as well. At 15′ clearance of the HP-HD combination was 107.21 ± 10.85 ml/min with HP yielding 88.32 ± 12.94 ml/min and at 180′ the total system clearance was 32.99 ± 2.68 ml/min with HP participation 22.63 ± 3.65 ml/min. AL removal was estimated at 906.5 ± 203.87 μg and its serum levels decreased from 166.5 ± 17.13 μg/liter to 101.75 ± 5.74 μg/liter. It is concluded that HP-HD combination with use of low doses DFO is safe for the patients and adequate in AL removal. The efficacy of the system is reduced significantly during treatment.

Insulin and hypertension in Chronic Renal Failure (CRF). *S. Kapoulas, M. Karamouzis*, N. Goutsaridis, A. Sioulis, A. Lazaridis, P. Nikolaidis, A. Dimitriadou*, and A. Tourkantonis, 1st Dept of Internal Medicine and Laboratory of Biochemistry, Medical School, University of Thessaloniki, Greece.* Chronic renal failure (CRF) is a condition frequently associated with insulin resistance and hyperinsulinemia. In spite of the fact that insulin plays an important role in the pathogenesis of essential hypertension, its role in the hypertension of CRF has not been elucidated. For this purpose, we performed the oral glucose tolerance-test (OGTT) and measured the total and ionic serum Ca in 20 normal controls and 40 patients with CRF (20 hypertensives and 20 normotensives) with Ccr 30-10 ml/min. We calculated the insulinogenic index (I.I.) (insulin/glucose) and the mean value of insulin (measured at the 5 times of the OGTT). In the control group, the mean values of insulin in all patients was 4.59 ± 5.56 μU/ml, of the I.I. 0.420 ± 0.40, of the total Ca 4.59 ± 0.22 and of the ionic Ca 2.28 ± 0.11 mEq/liter. In the normotensives the OGTT was abnormal in 5 out of the 20 patients (25%) and the mean values of insulin 49.78 ± 0.68 μU/ml (p = NS), of the I.I. 0.425 ± 0.040 (p = NS), of the total Ca 4.38 ± 0.15 ($p < 0.001$) and of the ionic Ca 2.22 ± 0.07 mEq/liter ($p < 0.05$). In the hypertensive patients, the OGTT was abnormal in 13 out of the 20 patients (65%) and the mean values of insulin were 64.11 ± 10.37 μU/ml ($p < 0.001$), of the I.I. 0.410 ± 0.069 (p = NS), of the total Ca 3.72 ± 0.13 ($p < 0.001$) and of the ionic Ca 1.69 ± 0.19 mEq/liter ($p < 0.001$). Conclusions: 1) The hypertensive patients with chronic renal failure have a higher rate of abnormal OGTT, higher levels of insulin and lower levels of ionic Ca compared to the normotensive ones. 2) The hyperinsulinemia and insulin resistance observed in chronic renal failure seem to contribute to the pathogenesis of hypertension in patients with CRF.

Insulin and atrial natriuretic peptide (a-ANP) in chronic renal failure (CRF). *S. Kapoulas, M. karamouzis*, A. Sioulis, N. Goutsaridis, P. Kordatos, P. Nikolaidis, A. Dimitriadou*, and A. Tourkantonis, 1st Dept of Internal Medicine and Laboratory of Biochemistry Medical School, University of Thessaloniki, Greece.* The atrial natriuretic peptide (a-ANP) is frequently found elevated in the plasma of patients with CRF. Factors which are implicated in the a-ANP incease are hypervolemia, hypertension, hormonal and, to a less degree, its reduced secretion and metabolism. Recent studies have shown that there is an interaction between a-ANP and insulin in their action, secretion and metabolism. Because CRF is associated with insulin resistance and hyperinsulinemia, we studied the relationship between a-ANP and the degree of hyperinsulinemia. We measured the levels of a-ANP, the mean values of insulin (measured at the 5 times of the oral glucose tolerance test) and plasma renin in 20 normal controls and 32 patients with CRF (17 hypertensives and 15 normotensives) with Ccr 40-20 ml/min. In the control group the mean values of insulin of all patients was 43.57 ± 6.55 μU/ml, of the a-ANP 45 ± 7 pg/ml and of the renin 1.45 ± 0.62 ng/ml/hr. In the normotensives, the mean values of a-ANP was 128.2 ± 37.8 pg/ml ($p < 0.001$), of the insulin 49.72 ± 7.97 μU/ml ($p < 0,05$) and of the renin 1.01 ± 0.45 ng/ml/hr ($p < 0.05$). In the hypertensives the mean values of a-ANP was 169.3 ± 33.18 pg/ml ($p < 0.001$), of the insulin 69.08 ± 10.87 μU/ml

($p < 0.001$) and of the renin 5.31 ± 1.53 ($p < 0.001$). Conclusions: 1) The hypertensive patients with CRF have higher levels of a-ANP, insulin and renin compared to the normiotensive ones. 2) The levels of insulin and a-ANP are positively correlated indepedently of the Hypertension and there seems to be an interaction between the two hormonal systems.

Isolated systolic hypertension and renal function: effect of antihypertensive therapy. *A.D. Efstratopoulos, M. Meikopoulos, and S. Voyaki, Hypertension Clinic and 3rd Medical Dept, Athens General Hospital Athens, Greece.* The aim of the present prospective study was to evaluate the effect of antihypertensive treatment in renal function of patients with Isolated Systolic Hypertension (ISH) and normal renal function. Fifty-eight pts (25M/33F, 54-84 yrs of age) followed in our Hypertension Clinic, were included in the study; finally 31 of those patients (10M/21F, 54-84 yrs old) followed for a period of 6-46 months were evaluable. Evaluation of renal function was done by GFR measurement (ml/min/1.73 m^2) twice in a month, before starting treatment, and under treatment during the last 2 months of the study period. Blood pressure (BP) before treatment was 170.6 ± 6.4/75.4 ± 3.5 mmHg (m ± SEM) (range: 160-225/60-90 mmHg), and under antihypertensive treatment (ACE-inhibitors, Diuretics, B-blockers, Ca^{++}-blockers) the final BP was 143.6 ± 5.4/78.3 ± 2.8 ($p = <0.01$/NS). Twenty-three out of 31 patients (74.2%, group-A) sustained or improved their renal function during the study period (ΔGFR: ±10 ml/min/1.73 m^2 or increased >10 ml/min/1.73 m^2), while 8 patients (25.8%, group-B) showed a deterioration of renal function (GFR decreased more than 10 ml/min/1.73 m^2) under treatment. The age of patients in group-B was significantly smaller than that of group-A (63.4 ± 7.7 vs 69.9 ± 6.7, p: 0.031), also patients of group-B were more commonly under treatment with diuretic monotherapy, in comparison to the patients of group-A that were more commonly treated with ACEI (78.26%) than those of group-B (50%). We conclude that: 1) Renal function in patients with ISH may remain stable or even inproved in 74.2% of the patients, under the effect of antihypertensive treatment (especially with the use of ACEI), and 2) 25.8% of the patients showed a deterioration of renal function (even with "normal" serum creatinine values), especially under chronic diuretic monotherapy.

Satisfactory long-term blood pressure control of renovascular hypertension (RVH) following successful percutaneous transluminal angioplasty (PTA). *I.G. Vlachojannis, P. Kurz, D.V. Vlahakos, E. Hinari, P. Grutzmacker, and W. Schoeppe, Division of Nephrology, Patras University Hospital, Rio, Patras, Greece and II Med. Klinik, St Markus Krhs. und GSF, Frankfurt, Germany.* PTA revolutionized the aetiologic therapy of RVH in both fibromuscular dysplasia (FMD) and atherosclerotic disease (ASD). Although the immediate post-dilatation effect on arterial Blood Pressure (BP) is well documented, the long term benefit is not yet, so clearly shown. In the present communication, we analyzed data of 124 successive PTA in patients with RVH (90 with ASD and 34 with FMD). The following table shows the systolic and diastolic blood pressures (mmHg), as well as, the mean number (No) of antihypertensive medications before, immediately after and 3 months, 1 year and three years following PTA.

	Before	After	3 months	1 year	3 years
FMD	n = 34	n = 34	n = 30	n = 29	n = 17
syst BP	153 ± 19	131 ± 4	131 ± 17	134 ± 17	137 ± 20
diast BP	95 ± 12	84 ± 9	83 ± 9	83 ± 10	84 ± 8
No meds	1.70	0.65	0.63	0.79	0.80
ASD	n = 90	n = 90	n = 69	n = 57	n = 25
syst BP	162 ± 22	145 ± 16	145 ± 18	146 ± 17	144 ± 15
diast BP	91 ± 14	84 ± 9	80 ± 8	85 ± 8	86 ± 8
No meds	2.53	1.48	1.55	1.38	1.36

PTA resulted in normalization of BP in 59% of patients with FMD, as opposed to 26% of those with ASD. Restenosis was seen in 24% of patients with FMD and in 19% of patients with ASD, one year following successful dilatation. In conclusion, with the exception of restenosis within the first post-dilatation year in a subset of patients with RVH treated with PTA, the majority of those patients can be expected to have satisfactory long-term BP control without other therapy or with a small number of antihypertensive medications.

Erythropoietin improves "functional anaemia" in predialysis chronic renal failure children. *F. Comianou[1], I. Papassotiriou[2], A. Karaklis[2], and H. Georgaki-Angelaki[1], [1]Dept. of Pediatric Nephrology and [2]Haematology Laboratory, "Aghia Sophia" Children's Hospital, Athens, Greece.* The anaemia seen in children with chronic renal failure (CRF) is multifactorial and characterized by decreased peripheral oxygen delivery and low circulating erythropoietin level. The aim of this study was to investigate the effect of r-HuEPO on the level of haemoglobin (Hb), 2,3 Diphosphoglycerate (2,3 DPG), oxygen affinity (P_{50}), oxygen carrying capacity (O_2^c) and oxygen released to the tissues (O_2^R) in 6 predialysis children with CRF (GRF with Cr^{51}-EDTA: 12.3 ± 7.2 ml/min/1.73 m^2). The measurements were performed before (I) and three months after (II) treatment with r-HuEPO in a dose of 50-100 U/kg, thrice weekly. The results (mean ± SD) are shown in the table.

	Hb g/dl	MCV fl	2,3DPG µm/ml RC	P_{50} mmHg	O_2^c vol %	O_2^R vol %
I	6.8±0.8	82.6±4.5	6.13±0.15	30.7±0.6	9.1±1.0	2.8±0.2
II	10.2±1.7	88.7±5.2	5.65±0.14	30.2±0.5	13.9±2.4	4.1±0.6

The pre-treatment with r-HuEPO results shown reduced O_2^R due to low levels of Hb and inappropriate to the degree of anaemia 2,3DPG and P_{50} values (expected 6.50 µm/ml RC and 32.5 mmHg respectively). Oxygen release increased significantly post-treatment due to the increase of Hb levels, while the 2,3DPG level is now significant lower and appropriate to the degree of anaemia. The P_{50} value remained unchanged. All the above indicate that treatment with r-HuEPO improves "functional anaemia" in predialysis CRF children.

Combined iv iron and low dose erythropoietin (rHuEPO) therapy in HD-patients. *T. Tsobanelis, P. Kurz, D. Hoppe, J. Vlachojannis*, and P. Grützmacker, II. Med. Clinic, St. Markus Hospital, Frankfurt/M, FRG, *Dept. of Nephrology, Patras University, Greece.* Development of iron deficiency has been observed during rHuEPO therapy, preventing from adequate therapeutic success. We investigated: 1. The incidence of functional iron deficiency during low dose i.v. rHuEPO combined with i.v. iron therapy, 3. Tolerance of this regimen. Forty HD-pts. without iron deficiency [Hct < 26%, ferritin >150 µg/liter, transferrin saturation (TFsat) >20%], were treated with i.v. rHuEPO (3 × 20 U/kgr body wt). Blood cell counts were controlled weekly and iron status twice monthly. Iron was given i.v. when TFsat was < 20% (3 × 40 mg Fe^{3+} – Na gluconate/week, after HD). Results: 32/40 (80%) pts developed iron deficiency before reaching the target Hct (30-35%). 19/40 (47.5%) pts reached the target Hct within 6 weeks. Despite intensive i.v. iron substitution TFsat remained low without a fall of ferritin. After 12 weeks, all 40 pts. had reached the target Hct, including 8 pts where rHuEPO was increased to 3 × 40 U/kgr body wt (ΔHct <3% after 6 weeks). Under combined i.v. iron and rHuEPO therapy hct increased by 0.8%/week. Conclusions: 1) Even under low doses rHuEPO functional iron deficiency developed in 80% of the pts. 2) Storage iron pool was not adequately mobilized, 3) Under combined i.v. iron and rHuEPO an improved response to rHuEPO was accomplished without major side effects.

Improvement of brain cell function after correction of renal anemia with erythropoietin (EPO) in CAPD patients. *I.G. Vlachojannis, G. Perschon, D.V. Vlahakos, E. Hinari, P. Grutzmacher, and W. Schoeppe, Division of Nephrology, Patras University Hospital, Rio, Patras, Greece and II Med. Klinik, St. Markus Krhs. und GSF, Frankfurt, Germany.* Metabolic encephalopathy, as part of the uremic syndrome, has been long recognized and pathologic tracings have been observed on conventional EEG recordings. The newest method of Topographic Brain Mapping (TBM) utilizes computer analysis of multiple EEG recordings and makes possible to define subtle neurophysiology changes in brain cell function and localize their topographic distribution in the brain. In order to dissociate the effect of anemia from the effect

of "uremic toxins" on uremic encephalopathy, we studied TBM recordings in 10 patients on CAPD, before and after correction of renal anemia with EPO. Patients were given EPO 20 IU/Kg SQ thrice weekly and their hematocrits improved from 25 ± 2.2 % to 35.2 ± 2.3 %. TBM recordings were evaluated with respect of frequency, absolute power and topographic distribution after the following evoked potentials: sensorimotor (SEP), visual (VEP) and acoustic (AEP). Changes in VEP were not significant in any patients. By contrast, improvement of SEP was found in 8 patients and of AEP in 3. We conclude that uremic metabolic encephalopathy is at least partly reversible after correction of renal anemia with EPO.

Study of endocrine function in patients under haemodialysis during therapy with erythropoietin. *D. Tsakiris, G. Visvardis, D. Papadopoulou, and M. Papadimitriou, Department of Nephrology, Hippokration General Hospital, Aristotelian University of Thessaloniki, Greece.* The aim of the study was to evaluate the possible hormonal changes in patients under chronic haemodialysis (HD) before and after treatment of anaemia with recombinant human erythropoietin (EPO). We studied six patients (3 males) with a mean age of 45 years (range 33-60) and a mean duration of HD of 65 months (range 34-137). The basal levels of anterior pituitary hormones (LH, FSH, TSH, prolactin), thyroid hormones (T3,T4) and testosteron were measured. Moreover, the differences in LH and FSH levels following stimulation of LHRH (LHRH-test) and in TSH and prolactin levels following stimulation of TRH (TRH-test) were accessed both before and after achievement of the therapeutic goal (Hct = 30-35%). The mean duration of treatment was 128.5 ± 8.2 days and during this period haematocrit increased from 19 ± 4.3% to 32.8 ± 4.3% ($p < 0.01$). Six normal subjects matched for age and sex were used as controls. A statistical significant difference in T3,T4,LH and prolactin levels before treatment was observed in patients compared to controls ($p < 0.002$, $p < 0.01$, $p < 0.02$ and $p < 0.008$ respectively). In contrast, no significant changes in hormone levels were observed before and after treatment with EPO, although in 4 of the 6 patients an improvement of libido was observed. In conclusion no alterations in studied hormone levels were observed. The improvement of libido was probably due to the correction of anaemia which resulted in increased physical well being and improved cellular metabolism.

Isotopic study of anemic patients under hemodialysis before and after treatment with erythropoietin (EPO). *D. Tsakiris, D. Papadopoulou, A. Siountas, G. Lagazalis, N. Karatzas, and M. Papadimitriou, Department of Nephrology, Hippokration General Hospital, Aristotelian University of Thessaloniki, Greece.* Total body hematocrit (TBHct), red cells survival (T) and plasma volume (PV), blood volume (BV) and red cells volume (RCV) per body surface (S), were estimated by isotopic methods in 15 anemic patients (5 men, mean age 46.4 years) on hemodialysis (HD) before and after intravenous administration of recombinant human erythropoietin (EPO) in order to treat anemia (therapeutic target: Hct = 30-35%). The aim of the study was to compare the changes of these parameters between patients with and without development or exacerbation of hypertension as a side-effect of treatment (group A, n = 8 and group B, n = 7 respectively). After a mean time of 166 ± 55 days and a mean dose of 214 ± 75 IU/kgr body wt/week, Hct and TBHct increased from 24.5 ± 3.4 and 20.8 ± 3.1 to 36.0 ± 5.7 and 30.6 ± 5.3 respectively ($p < 0.001$), RCV/S increased and PV/S decreased from 511 ± 95 and 1965 ± 381 to 774 ± 158 and 1763 ± 304 ($p < 0.001$ and $p < 0.01$ respectively), whereas BV/S and T remained stable. Similar changes were observed in groups A and B, but comparison between these two groups did not show any changes before and after treatment, neither there was any difference in the mean dose of EPO or duration of treatment. In conclusion recovery of anemia in HD patients in accompanied by an increase in TBHct and RCV/S and a decrease in PV/S in both groups, which probably shows that hypertension as a side-effect of EPO, is not volume-dependent.

Study of cell mediated immunity in hemodialysed patients (HDP) after administration of β-glycosylated erythropoietin (β-EPO). *Chr. Iatrou[1], G. Topakas[2], D. Skoumi[2], N. Afentakis[1], E. Karchilaki[2], G. Moustakas[1], A. Germenis[2], A. Stavropoulou[2], and P. Zirogiannis[1], [1]Dept. of Nephrology, General Hospital of Athens. [2]Histocompatibility Laboratory, General Hospital of Athens, Greece.* Disturbances in cell mediated immunity (CMI) in uremia usually dominates of the other immunological disorders. The effect of EPO on CMI has not been elucidated. The purpose of this work was to study the influence of β-EPO on CMI in HDP. In 8 HDP, the lymphocytes subsets (Total T: CD3, Helper: CD4, Suppressor: CD8) and the Natural killer cells (CD16) were measured in blood samples, before and 6 months after the treatment with β-EPO, by using flow cytometry. In the same group of patients and in 8 healthy volunteers (as controls C) we also studied the T-lymphocyte proliferation after incubation with H^{3}* and stimulation by PHA and their suppression by methylprednisolone (MP). Our results are shown in the tables I and II.

Table I

	T3	T4	T8	T4/T8	KC
Before β-EPO	966 ± 410	611 ± 221	384 ± 194	1.7 ± 0.35	168 ± 76
After β-EPO	1172 ± 809	723 ± 489	470 ± 317	1.7 ± 0.7	118 ± 79
p	p > 0.1	p > 0.1	p > 0.1	p > 0.1	p > 0.1

Table II

	PHA cmp	MP cpm
I Controls	38281 ± 3270	24750 ± 2964
II Before β-EPO	12201 ± 6953	4497 ± 1692
III After β-EPO	15654 ± 5928	9182 ± 4789
The statistical correlation shows:	$PHA_{I \to II}$ $p < 0.001$	$MP_{I \to II}$ $p < 0.001$
	$PHA_{I \to III}$ $p < 0.001$	$MP_{I \to III}$ $p < 0.001$
	$PHA_{II \to III}$ $p > 0.1$	$MP_{II \to III}$ $p < 0.05$

In conclusion, it seems that β-EPO does not improve significantly the CMI of HDP.

The influence of β-glycosylated erythropoietin (β-EPO) on platelet aggregation in hemodialysed patients (HDP). *Chr. Iatrou[1], A. Kefalas[3], N. Afentakis[1], I. Apthentopoulos[1], S. Antonopoulou[2], K.A. Demopoulos[2], R. Stathopoulou[3], and P. Zirogiannis[1], [1]Dept. of Nephrology, General Hospital of Athens, [2]Dept. of Chemistry, Univ. of Athens. [3]Dept. of Hematology General Hospital of Children "P. and A. Kiriakou", Athens, Greece.* Clinical studies have demonstrated the efficacy of EPO in correcting anaemia and platelet function in HD pts. Some of these studies refer to the influence of α-glycosylated EPO on the platelet aggregation induced by ADP and arachidonic acid (AA). The purpose of this work is to study the platelet aggregation which is induced in all three ways ADP, AA and Platelet-Activating Factor (PAF) after treatment with β-EPO. In 6 HD pts the platelet aggregation induced by ADP, PAF and AA before and about 6 months after treatment with β-EPO was studied. Our results show that EC50 (the concentration of the substance which gives aggregation to 50% of platelets) for PAF and ADP before and after treatment with β-EPO are: PAF EC50 before: $4.13 \times 10^{-5} \pm 2.49 \times 10^{-5}$, PAF EC50 after: $2.89 \times 10^{-5} \pm 1.53 \times 10^{-5}$, ADP EC50 before: $2.15 \times 10^{-5} \pm 0.88 \times 10^{-5}$, ADP EC50 after: $1.92 \times 10^{-5} \pm 0.49 \times 10^{-5}$, ($p > 0.1$ respectively). There is not a statistically significant difference in the platelet aggregation induced by AA. In conclusion: 1) although β-EPO improves the platelet aggregation induced in these three ways (ADP, PAF and AA) its influence isn't statistically significant. The latter may be because of the small number of HDP included in this study.

Results in 505 renal transplantations. *A. Kostakis, Gr. Vosnides, St. Kyriakides, Sp. Garbis, G. Zavos, I. Boletis, Ch. Stathakis, D. Stamatiades, A. Lagouranis, A. Stavropoulos, V. Hatziconstantinou, L. Doumas, M. Pappas, N. Papadodimas, C. Siamopoulos, and A. Billis, Department of Transplantation and Nephrology. Laïkon General Hospital Athens, Greece.* From March '71 - December '91 we performed 505 kidney transplantations. The results of the first 165 transplants, in which either the conventional or the double (MP + CYA) immuno-

suppressive therapy were used, have been previously reported. In the remaining 340 transplants, 189 from living related (Group I) and 151 from cadaveric (Group II) donors, performed between Sept '86 - Dec '91, triple immunosuppressive regimen consisting of MP + AZA + CYA was used. There were 10 deaths and 19 graft losses in Group I and 11 deaths and 18 graft losses in Group II. The remaining 282 pts are alive with adequate graft function. In Group I, at 1,3 and 5 yrs the graft survival rate is 89.6%, 80.3% and 80.3% and the pts survival rate is 97.0%, 92.5% and 92.5% respectively. In Group II, at 1,3 and 5 yrs the graft survival rate is 81.5%, 77.6% and 66.1% and the pts survival rate is 93.0%, 90.4% and 87.1% respectively. It is concluded that the reduced incidence of rejection and infections, the low dose of immunosuppressive drugs and the favourable effect on pt and graft survival render the use of the triple immunosuppressive therapy in renal transplantation advantageous.

Antilymphocyte globulin (ALG) in renal transplant (RT) patients with delayed graft function (DGF). *Gr. Vosnides, J. Boletis, D. Stamatiadis, E. Papastathi, E. Psimenou, Ch. Koronis, D. Goumenos, J. Bokos, and A. Kostakis, Department of Nephrology and Transplant Unit, Laikon General Hospital, Athens, Greece.* DGF is a major problem in RT. The purpose of this study was the comparative evaluation of two induction immunosuppressive therapies, in pts with DGF due to acute tubular necrosis (ATN). Thirty three cadaveric recipients who presented post-transplant ATN and received as initial immunosuppressive therapy methylprednizolone (MP) and azathioprine (AZA) (group A, N = 17) or ATG, MP and AZA (group B, N = 16), were studied. When graft function improved, CsA was added to maintenance therapy. Although there was a significant difference (p = 0.007) in follow-up time between the two groups (group A 10.7 ± 6.5 and group B 5.3 ± 3.7 months) there were no differences regarding sex, age and HLA A, B and DR donor/recipient compatibility. No significant difference was found between the two groups regarding the first 10 post-transplant months with respect to pt (84.7% vs 88.9%, p = 0.87) and graft survival (82% vs 87%, p = 0.72), creatinine (1.9 ± 0.9 vs 1.6 ± 0.3 mg%, p = 0.24), deaths due to infections (one in each group), CMV infection episodes (3 and 2 respectively) and the number of infection episodes during the first 6 post-transplant months (15 and 20 respectively). It was observed that the pts in group B who received ATG compared to those of group A, suffered significantly less acute rejection episodes (4 vs 11, p = 0.008), had shorter mean hospitalization time (27.6 ± 14.1 vs 39.1 ± 16.8 days, p = 0.04), required less hemodialysis sessions (4.4 ± 5.9 vs 10.7 ± 11.5, p = 0.05) and received less corticosteroids during the first month (2.6 ± 1.9 vs 3.8 ± 1.6 gr, p = 0.02). It is concluded that in pts with cadaveric RT and ATN, the addition of ATG to conventional immunosuppressive therapy is safe and offers the advantage of reduced acute rejection episodes with less corticosteroid administration and earlier recovery of graft function without increased morbidity and mortality.

Follow-up of cytotoxic antibodies in haemodialysis (HD) patients during a 5-years period. *D. Tsakiris, P. Vakianis, K. Karamitsos, D. Papadopoulou, D. Memmos, G. Sakellariou, A. Polymenidis, and M. Papadimitriou, Department of Nephrology, Aristotelian University, Hippokration General Hospital, Thessaloniki, Greece.* From 1986-1990 the titers of serum panel reactive antibodies (PRA), in 97 HD patients (65 males, mean age 50 yrs) were evaluated. The aim of the study was to define the hypersensitized patients and possible factors contributing to the maintenance of high PRA. During the first year of the study, 58 pts (60%) had a peak PRA 0-20% (group A), 20 pts (21%) had PRA 21-50% (group B) and the remaining 19 pts (19%) had been hypersensitized with PRA >50% (group C). Group C included more females than group A (47% vs 29%, NS), had more pregnancies (3.1 vs 2.1, NS), more patients had been transplanted (63% vs 31%, NS) and had more blood transfusions (42.1 ± 36.7 vs 9.7 ± 11.6, p < 0.001). After 5 years a shift of patients to the groups with lower PRA was observed, group A = 79 pts (81%), group B = 11 pts (11%) and group C = 7 pts (8%). This change compared to background was statistically significant (p < 0.01) and was mainly due to the use of erythropoietin (EPO), which was given to 11/58 (19%), 5/20 (25%) and 9/19 (47%) patients of groups A,B and C respectively (DF = 2, x^2 = 6.035, p < 0.05). Six of the 19 initially hypersensitized patients had stable PRA >50% during the five years of the study, while 4 from the remaining 13 patients who changed into groups A and B were transplanted (3 successful). In conclusion, a 5-years follow-up of PRA in HD pts has shown a significant decrease of the proportion of patients with high PRA. This was mainly due to EPO administration which limited the need for BT and resulted in transplantation of some hypersensitized patients.

Clinical and laboratory findings in lower gastrointestinal track (LGIT) perforations following renal transplantation (Tx). *D.V. Vlahakos, I.G. Vlachojannis, E. Milford, and N. Tilney, Division of Nephrology, Patra University Hospital, Rio, Greece, and Brigham and Women's Hospital (BWH), Harvard University Medical School, Boston, USA.* LGIT perforations following renal Tx are rare but extremely serious and frequently lethal: of 1285 renal Tx performed at BWH between 1951-90, 29 pts (2.2%) developed 32 incidents of LGIT perforations, 12 of which (41%) were fatal. Rectosigmoid was the site of perforation in 2/3 of the cases (most frequently due to diverticulitis) and cecum/ascending colon in 1/4 of the cases (most frequently due to ischemic enterocolitis). Among >30 clinical and laboratory parameters analyzed, the intensity of immunosuppression with steroids, the nutritional status and the prompt diagnosis and surgical management were found to influence most the genesis and the prognosis of perforations in these pts. Potent immunosuppression is given to maintain the graft and compat rejection. Following Tx 28% of LGIT perforations occured within the 1st month, 47% within the first 3 months and 60% within the 1st year. Similarly, 25% of LGIT perforations were seen within one week and 50% within a month following Solu-Medrol pulse therapy for rejection. The intensity of immunosuppression with steroids, had a grave effect on mortality: the mean daily dose of prednisone was 3 times higher in those who died (168 ± 65 mg/day), as opposed to those who survived (55 ± 15 mg/day) the perforation episode (p = 0.02). Also, due to steroids, clinical manifestations of perforation at presentation were subtle: 91% of pts were febrile but only 53% developed fever >38° C; 84% complained of abdominal discomfort but pain became generalized with rebound tenderness and absent bowel sounds in 20%; 31% had nausea/vomiting; 23% diarrhea, 31% constipation and 33% blood in stools. Leukocytosis was seen in only 60% and pneumoperitoneum in 25%. Prompt diagnosis and surgical intervention influenced the prognosis: 22% of those operated within 24h of symptoms died as compared to 47% of those in whom surgical intervention was delayed. Finally, the nutritional status was an important predictive factor for survival: the serum albumin of those who died was 2.5 ± 0.18 g/dl, and those who survived 3.4 ± 0.15 g/dl (p = 0.002). In conclusion, high index of suspicion and aggressive diagnostic evaluation, including laparotomy, judicious use of steroids and early nutritional support constitute the therapeutic targets in LGIT perforations following renal Tx.

Hormonal und ultrasound characteristics of menstrual function after successful renal transplantation. *D. Koutsikos[1], A. Sarandakou[2], D. Kassanos[2], D. Rizos[2], A. Kapetanaki[1], B. Agroyannis[1], and I. Phocas[2], [1]Clinic of Nephrology, [2]2nd Clinic of Gynecology and Obstetrics, University of Athens, Aretaieio Hospital, Athens, Greece.* The cycles of 11 renal transplant recipients (RTR), at least 24 months after stabilization of graft function meanstruating regularly, were evaluated by concurrent and systematic determinations throughout the cycle of LH, FSH, estradiol, progesterone, testosterone, prolactin and SHBG and by ultrasound follow-up. Biphasic estradiol secretion, midcycle LH and FSH surge, duration of luteal phase, midluteal progesterone values and ultrasonic parameters were consistent with: 1) normal ovulatory cycles in five women, 2) ovulatory cycles with luteal phase deficiency in five women and 3) anovulatory cycles in one woman. Thus, after successful renal transplantation, luteal phase deficiency was a very common syndrome, in equal percentage with normal ovulatory cycles.

Effect of calcium antagonists on renal graft function. *P. Alivanis, D. Grekas, A. Siulis, C. Diudis, V. Derveniotis, S. Vasiliu, and A. Tourkantonis, Renal Unit, First Medical Department, University Hospital AHEPA, Thessaloniki, Greece.* Studies in experimental models of renal ischemia have shown that calcium antagonists are effective in the protection of the ischemic insult. Thirty-five patients who received a kidney graft the last two years (nifedipine group) were compared with

35 consecutively transplanted patients (control group). The two groups were compatible for age, sex, duration of hemodialysis, graft matching and total number of blood units transfusion. The patients of the nifedipine group were given 0.2 mg nifedipine (solution 10%) through the renal artery immediately after revascularization and also nifedipine per os during all the study period. Adequate diuresis (1 ml/min) was obtained in 14.5 ± 37.2 and 43.9 ± 46.8 hours after transplantation in nifedipine and control group respectively ($p < 0.01$). Acute tubular disfunction frequency and serum creatinine levels were found higher in the control group. Fractional excretion of sodium was not found to be different in the two groups the first day, but it was significantly lower the first week after transplantation in the nifedipine group ($p < 0.05$). Acute rejection episodes were found to be more frequent in the control group the first six months after transplantation ($p < 0.05$). It is suggested that nifedipine is effective in the protection of renal function after transplantation.

Infections in renal transplant (RT) patients treated with triple immunosuppressive therapy. *J. Boletis, Ch. Stathakis, Ch. Koronis, E. Psimenou, E. Papastathi, D. Stamatiadis, D. Goumenos, G. Zavos, A. Kostakis, and Gr. Vosnides, Department of Nephrology and Transplant Unit, Laikon General Hospital, Athens, Greece.* The purpose of the study was the evaluation of the incidence and type of infections, as well as their clinical implications, in RT pts treated with triple immunosuppressive therapy (Methylprednisolone, Azathioprine and Cyclosporine). We evaluated retrospectively, the infection episodes in 84 pts (53 males, 31 females), aged 40.2 ± 12.7 years, who underwent RT (42 from cadaveric and 42 from living related donor) from Aug. 89 until Aug. 90 and were under triple immunosuppressive therapy. During the 15.3 ± 6.7 months of follow up we noted: 1) Five deaths, from which only one was due to infection, 2) Ten renal graft losses, from which only one was due to infection, 3) One hundred and four infection episodes in 57 (67%) pts (acute pyelonephritis: 33%, asymptomatic bacteriouria: 19%, CMV: 14%, pulmonary infection: 10%, upper respiratory infection: 9%, HSV: 5% and others: 10%). Sixty seven percent of the infection episodes occured during the first 6 post-transplant months. 4) Thirty pts (53%) experienced only one infection episode while 27 pts (47%) had multiple ones. No significant differences were observed between pts with and those without infection regarding sex, age, graft source, follow-up time, number of acute rejection episodes, total steroid dose, as well as pt and graft survival. Our findings indicate, that triple immunosuppressive therapy in RT is safe regarding the incidence of infections and infection complications.

Hepatis C virus (HCV) infection in renal transplant patients. *J. Boletis, Ch. Stathakis, E. Papastathi, D. Goumenos, D. Stamatiadis, E. Vafiadi, A. Chatzakis, A. Kostakis, and Gr. Vosnides, Department of Nephrology and Transplant Unit, Laikon General Hospital, Athens, Greece.* The purpose of the present study was the utilization of the 2nd generation immunoenzymic test for the evaluation of the prevalence and clinical implications of HCV infection in renal transplant (RT) pts. For this, the presence of anti-HCV was determined by using the "Abbott HCV EIA 2nd Gen./anti-HCV EIA suppl. assay" in 156 RT pts (99 M, 57 F) aged 42.6 ± 11.8 yrs who were on HD prior to RT for 2.5 ± 2.0 yrs and with functioning graft for 37.1 ± 29.7 months. Anti-HCV were present in 41/156 pts (26.3%) and their prevalence was not related to the sex ($p = 0.92$) or the age ($p = 0.14$) of the RT pts. The anti-HCV (+) pts compared to the anti-HCV (−) pts had significantly shorter time with functioning graft (29.5 ± 22.5 vs 39.9 ± 31.7 months, $p = 0.03$) and longer pre-transplant time on HD (3.2 ± 2.3 vs 2.3 ± 1.9 yrs, $p = 0.04$). The 41 anti-HCV (+) pts were found to be: 1 (2.4%) HBsAg (+), 21 (51.2%) anti-HBc (+), 23 (56%) anti-HBs (+) and 15 (36.6%) anti-HBs (+)/anti-HBc (+). Twenty-three of the 41 (56%) anti-HCV (+) RT pts had persistently abnormal liver function tests (LFT'S). The prevalence of abnormal LFT'S was not significantly different ($p = 0.36$) from that of the anti-HCV (−)/HBsAg (+) RT pts. The results of the present study indicate that: 1) In RT pts the prevalence of HCV infection is high and proportional to the pre-transplant HD time and inversely proportional to the post-transplant time. 2) In a substantial proportion of anti-HCV (+) RT there is evidence of previous infection with hepatitis B virus. 3) Anti-HCV (+) RT pts have a high prevalence of abnormal LFT'S comparable to that of the HBsAg (+) RT pts.

Evaluation of morphological changes of peritoneal membrane in CAPD patients with loss of ultrafiltration. *V. Vargemezis, J. Hatzibougias, R. Papadakis, A. Euthimiadou, E. Thodis, and N. Lirantzopoulos, Division of Nephrology, Thrace University, Greece.* In order to evaluate the morphological status of peritoneum in CAPD patients with ultrafiltration loss, we performed open biopsies of peritoneal membrane in 10 such pts. Specimens of parietal peritoneum were examined with light and electron microscopy. The observed changes in all pts were moderate to severe fibrosis of parietal peritoneum and severe oedema of submesothelial connective tissue. In 8 pts we noticed the presence of numerous particles of foreign body material infiltrating all strata of peritoneum. These foreign bodies were of various shapes and dimensions with and without cellular reaction (Histiocystic) around them. Using electron scanning microscopy with Röentgen microanalysis technique, it was revealed that the nature of these particles was a complex of anorganic substances composed of pieces of silicone, titanium, Ca^{++}, P^{++} and S^{++}. Conclusions: 1) We confirm the severe structural changes of peritoneum (thickening, fibrosis etc.) reported in the literature in CAPD patients with ultrafiltration loss or diminution. 2) Foreign body particles could play an important role in the pathogenesis of these changes.

Evaluation of CNS-function in CAPD patients using magneto-ecgephalography (MEG). Comparison with hemodialysis patients. *E. Thodis, P. Pasadakis, and V. Vargemezis, Division of Nephrology, Thrace University, Greece.* In order to evaluate the CNS-function of uremic patients, the magnetic activity emmited from the brain of 20 pts (10 pts on CAPD and 10 on HD) was measured. MEG consisted of taking 32 concecutive records from the 32 equally spaced points chosen on the uremic scull around our reference points T3, T4 of the international 10-20 electrode placement point system. MEG data were converted using an AD-converter with sampling frequency 256 Hz and stored in a P/C. Our results showed significant differences between the two groups. In all HD-patients there was an abnormal magnetic brain activity with high spectral amplitudes (in the band 2-7 Hz) which was more prominent in pts on hemodialysis for more than 4 years. The magnetic activity was whithin normal ranges in all CAPD pts. According to these observations we conclude that: 1) There is a high magnetic brain activity in HD-pts, which, in accordance with the EEG findings are signs of diffuse encephalopathy. 2) CAPD pts show a very low magnetic brain activity which must be interpreted as normal brain function and 3) MEG can be useful in further measurment of adequacy of dialysis.

Metabolic disturbances in CAPD and platelet prostanoids production. *S. Antoniou, A. Dimitriadis, and P. Makris, CAPD Unit, Agios Dimitrios Hospital, Thromb. Hemost. Unit, AXEPA Hospital, Thessaloniki, Greece.* Metabolic disturbances in CAPD tend to be similar to those observed in nephrotic syndrome and diabetes mellitus, conditions with overt platelet hyperactivity. A similar platelet behaviour in CAPD could be expected. The metabolic activity of the cyclooxygenase pathway (COP) was studied in platelets of 20 patients on CAPD and 13 individuals (C). COP was evaluated by determining malonyldialdehyde production – which reflects TXA2 production – under basal (MDA) and stimulated (MDAa) conditions using the thiobarbituric method and N-ethylmaleimide as stimulator. In CAPD, MDA (nmol/10^9 plat) was higher than C (1.89 ± 0.89 vs 1.32 ± 0.45, $p < 0.05$). MDA was similar (6.26 ± 1.54 vs 6.66 ± 1.63) but the Δ% was less in CAPD (387 ± 163 vs 540 ± 172, $p < 0.02$). CAPD patients had significantly higher levels of glucose (G), triglycerides (Tg) and fibrinogen (F) and lower HDL and albumin (Alb). A correlation of MDA with G ($r = 0.507$, $p < 0.05$) and Alb ($r = -0.456$, $p < 0.05$) was found. In CAPD, platelets have a tendency to increase prostanoids production under basal conditions (because of hyperglycemia and hypoalbuminemia) while they appear exhausted under stimulated conditions.

Epidemiology of peritonitis and sensitivity/resistance of microorganisms during a five-year period of CAPD in one center. *D. Tsakiris, P. Vakianis, G. Visvardis, P. Tsatrafillias, R. Antoniadou, A. Kyrou, and M. Papadimitriou, Department of Nephrology and Microbiology, Hippokration General Hospital, Thessaloniki, Greece.* From 1987 to 1991, 552 cultures of peritoneal dialysate in patients on CAPD were

performed and the sensitivity of microorganisms to antibiotics was studied, in order to evaluate the epidemics of peritonitis and the probable development of resistance to chemotherapy. Gram(+) microorganisms were isolated from 243 cultures (44%), Gram(−) from 97 (18%) and fungi from 59 (11%). In 5 cultures (1%) more than one pathogen were developed and 148 cultures were negative (26%). This proportion remained stable during the study and ranged from 40% to 53%, 9% to 26%, 7% to 15% and 15% to 38% respectively. The most common microorganisms were staph. epidermidis in 127/552 (23%), staph. aureus in 81/552 (15%), pseudomonas species in 31/552 (6%) and E.Coli in 30/552 (5%). Excluding negative cultures and those in which fungi were isolated, the sensitivity of 340 cultures to vancomycin (V), ceforanide (C), netromycine (N), amikacin (A) and trimethoprime-sulfamethoxazole (T/S) was studied. Only the first four antibiotics were widely used in the treatment of peritonitis. The overall sensitivity of Gram(+) and (−) microorganisms was 81%, 77%, 73%, 79% and 58% to V, C, A, N and T/S respectively. Gram(+) microorganisms were sensitive to V, N, A, C, and T/S in 82%, 81%, 79%, and 52% respectively. The sensitivity to V and C remained stable during the study, whereas resistance to N, A and T/S developed after three years. The sensitivity of Gram(−) microorganisms to N, A, V, C and T/S was 77%, 76%, 73%, 69%, and 44% respectively. The sensitivity to N remained stable during the study ranging from 75 to 84%, whereas the sensitivity to A, V, C and T/S ranged from 54% to 100%, 57% to 81%, 42% to 88% and 19% to 84% respectively. In conclusion, Gram(+) microorganisms and especially staph. epidermidis and staph. aureus were the main pathogens of peritonitis during a five-year CAPD period. The sensitivity of both Gram(+) and Gram(−) bacteria to V, N and A remained stable, justifying the use of these antibiotics as a first choise agents in the treatment of peritonitis.

Reevaluation of peritonitis due to staphylococcus epidermidis (SE) in CAPD. *A. Katirtzoglou, N. Apostolidis, E. Prassa, G. Bougatsos, and T. Mountokalakis, 2nd Department of Internal Medicine, University of Athens, Medical School, Hippokration Hospital, Athens, Greece.* The importance of peritonitis as a restrictive factor in the advance of CAPD is well recognized. Most studies, however, deal with the management and prevention of peritonitis due to causes generally accepted as hard to treat and disregard bacterial pathogens presumed to cause mild forms of peritonitis. Although SE is considered to cause a mild and easily managed peritonitis sporadic studies have challenged this view. During the period 1982-1991, 178 episodes of peritonitis in 115 patients undergoing CAPD were observed in our unit. In 36 (20.2%) of these cases SE was demonstrated to be the causative agent. In all cases, fever was present and more than 4.000 cells per ml were counted in the first sample of peritoneal fluids. In 8 cases, the clinical picture was severe mimicking acute abdomen (acute, diffuse abdominal pain, abdominal wall rigidity, nausea, vomiting). In two additional cases there were recurrences of peritonitis and in one of them removal of peritoneal catheter was judged to be necessary. Recurrences were attributed to non compliance to the long term therapeutic regimen used in our unit. This regimen includes intraperitoneal administration of two antimicrobial agents for at least 21 days after the first negative culture. It is concluded that the view that peritonitis due to SE has a mild and uncomplicated course should be reconsidered.

Therapeutic management of exit-site and/or subcutaneous tunnel infections in patients undergoing CAPD. *G. Metaxatos, B. Margellos, N. Nikolopoulou, D. Hadjiyanakos, D. Georgakopoulou, A. Gerakis, J. Parasiris, G. Bagiatoudi, and A. Billis, Division of Nephrology, Evangelismos Hospital, Athens, Greece.* Catheter exit-site (ES) and/or subcutaneous tunnel (ST) infection is one of the most common causes of peritoneal catheter removal in patients (pts) receiving CAPD. We studied retrospectively 34 pts (15M, 19F), 15 to 78 years old, who developed this complication and accounted for 25% of all pts who started CAPD from May 1983 to August 1991. These pts developed 46 episodes of infection affecting the ES (25 episodes in 20 pts), the ST (10 episodes in 9 pts) or both (11 episodes in 5 pts). In 39 episodes (85%) the responsible microorganisms were staphylococci (aureus 14, epidermidis 8) or pseudomonas (10), while in 7 episodes (15%) the cultures were sterile. The initial treatment consisted of empirical or culture based administration of antibiotics and careful local cleaning of the ES (conservative therapy); however, if the infection persisted for more than 7-10 days "deroofing" of the tunnel and "depilation" of the distal cuff was also performed and finally in cases of resistant peritonitis, the catheter was replaced. Twenty one out of 30 episodes of ES infection (70%) were treated by conservative therapy and seven (23%) by "depilation" of the distal cuff, while in two episodes (2 pts) the catheter was replaced. Twelve out of 16 episodes (75%) of the ST infection were treated by distal cuff "depilation" and in the remaining 4 the catheter was replaced. In conclusion, conservative therapy and distal cuff "depilation" was an effective treatment in 87% of episodes of ES and/or ST infection, while the catheter was replaced in a small percentage of pts.

Study of the metabolic status of patients on CAPD in relation to the PE test. *Th. Pliakogiannis, F. Papoulidou, Ch. Chatzidimitriou, Th. Tsalkidou, and K. Kalaitzidis, Nephrology Clinic, General Hospital of Kavala, Greece.* The aim of this study was the evaluation of the metabolic status of 29 patients, diabetic or non-diabetic, on CAPD. The patients were divided into two groups according to the results of the Fast Peritoneal Equilibration Test (Twardowski): High Absorbers (CAPD-H) n = 19 and Low Absorbers (CAPD-L) n = 10. The results are shown on the following tables:

PE-test	Age	Time CAPD	Body wt Kgr	% Rel. Body wt	Great. mg%
CAPD-H	58±9	16±7	68±14	111±20	11.5±2.6
CAPD-L	64±6	9±5	81±21	120±22	12.2±3.4

PE-test	Prot. UNA (g)	Urea mg%	Dkcal	Gluc. mg%
CAPD-H	62±8	114±40	520±90	145±52
CAPD-L	67±12	142±43	430±50	127±41

PE-test	HbA1 %	Pr. Loss g/24hr	KT/V	Album. g%
CAPD-H	7.8±1.1	9.7±4.4	2.1±0.2	3.7±0.5
CAPD-L	7.5±1.3	6.2±2.0	1.7±0.6	3.8±0.4

PE-test	CHOL/HDL	HDL mg%	CHOL mg%	TRG mg%
CAPD-H	7.13±1	26±5	185±50	170±89
CAPD-L	9.36±3	24±3	217±68	265±99

Prot. (UNA): Protein intake as calculated by Urea Nitrogen Appearance (UNA).
Dkcal: Daily caloric intake from dialysate.
Pr. Loss: Daily protein loss into the dialysate.

The conclusions are summarised as follows:

1) The age of the CAPD-H group was significantly lower than the CAPD-L group ($p < 0.05$) and the time on CAPD was significantly longer in the CAPD-H group than the CAPD-L group ($p < 0.01$).
2) The KT/V dialysis index did not differ significantly between the two groups.
3) Diabetic patients only presented with HbA1 values above normal.
4) The CAPD-H group had greater protein loss into the dialysate than the CAPD-L group ($p < 0.01$).
5) The body weight mean values of both groups of patients were larger than the ideal body weight, irrespectively of their classification according to the Peritoneal Equilibration Test, although the midearm muscle circumference of the majority of patients showed mild or, in some cases, severe protein malnutrition, with no statistically significant difference between the two groups.

6) The CHOL/HDL ratio was statistically higher in the CAPD-L group ($p < 0.05$), as was the mean triglyceride value of the same group ($p < 0.05$). The small number of patients compells us to be cautious in the interpreration of the results mentioned above.

Adrenal microadenomas and hypertension. Diagnostic significance of plasma renin and aldosterone. *A. Pierides, M. Zavros, A. Papanastasiou, P. Symeonides, Ch. Tziakouri, and A. Costeas, Nicosia General Hospital, Cyprus.* Twenty-five hypertensive patients suspicious of an adrenal microadenoma on CT were investigated with lying and standing PRA and aldosterone measurements. Based on their endocrine, functional characteristics 2 groups of patients were identified. Five patients (group 1) were shown to have an aldosterone secreting adenoma and underwent a therapeutic adrenalectomy with resolution of their hypertension and hypokalemia. Plasma aldosterone was significantly high in these patients both in the lying and standing position. (lying 75, standing 84.8 ng/dl). PRA was suppressed (0.14 lying, 0.07 ng/ml/hr, standing) and there was hypokalemia between 1.9 and 3.5 mEq/liter. The remaining 20 patients did not show any convincing evidence for primary aldosteronism. PRA rose on standing (1.06 → 3.50 ng/ml/hr) and there was an appropriate aldosterone response (15.2 → 38.7 ng/dl). No adrenalectomy was carried out in this second group of patients and their hypertension is controlled pharmacologically.

Plasma endothelin (ET) in chronic renal failure (CRF). *Th. Karabournioti, D. Moutzouris, E. Papathanassiou, Ch. Koutsia, D. Maintas, D. Emmanouel, and A. Agrafiotis, Departments of Nephrology and Microbiology Asclepeion Hospital, Athens – Department of Nephrology University of Creta – Haemodialysis Unit "Dragini" Clinic, Athens, Greece.* ET is a vasoconstrictor peptide produced by the endothelium of large arteries. Since the release and/or the metabolicc degradation of this peptide might be altered in CRF, we have measured, by RIA, plasma ET concentration in 18 haemodialysis (HD) patients, before and after HD session, using a cuprophan membrane, 16 non-HD uremic patients (plasma creatinine 6.2 ± 1.8 mg%) and 12 normal subjects. Moreover, in 4 nephrectomies, during the operation process, the ET arteriovenous difference was measured and was found to be >32%, indicating renal clearance of ET. Plasma ET concentration was significantly elevated ($p < 0.01$) before HD (16.8 ± 2.1 fmol/ml) compared with healthy controls (8.6 ± 1.6). After HD (mean Δ weight 2.1 ± 0.8 kg) plasma ET level remained unchanged (16.1 ± 2.6), indicating no ET clearance accross the cuprophane membrane. In the non-HD uremic patients plasma ET level (12.3 ± 1.9) was significantly ($p < 0.05$) higher than in controls and lower than in HD patients. In these patients there was a significant correlation between serum creatinine and plasma ET concentration ($r = 0.65$). On the contrary, there was no relationship between plasma ET level and arterial pressure ($r = 0.12$) in all the cases of this study. Our data demonstrated that: 1) There is a relationship between the degree of CRF and the plasma ET level. 2) ET is cleared by the kidney but not by the cuprophan membrane, thus the HD patients present the highest ET level. 3) There is no relationship between plasma ET concentration and arterial pressure and 4) The influence of ET on CRF patients has to be elucidated.

The influence of parathyroid hormone (PTH) on platelet-activating factor (PAF) blood levels in hemodialysed patients. *Chr. Iatrou[1], S. Antonopoulou[2], N. Andricopoulos[3], S. Moutafis[1], G. Tsoufakis[1], K. Haralabopoulos[4], C.A. Demopoulos[2], and P. Zirogiannis[1], [1]Dept. of Nephrology, General Hospital of Athens, [2]Dept. of Chemistry, University of Athens, [3] Chemical Dept. of Social Insurance Foundation, [4]Dept. of Experimental Physiology, University of Ioannina, Greece.* Bleeding has been considered as one of the clinical manifestations of uremia. Among the factors which are incriminated for it, is the reduction of platelet aggregation. As far as the last is concerned the high levels of PTH (because of the secondary hyperparathyroidism) which was found to inhibit the platelet aggregation in response to agonist such as ADP, arachidonic acid and PAF in vitro. In this work we have studied the PTH influence on PAF levels in blood from hemodialysed patients (HDpts). In 8 HDpts with severe secondary hyperparathyroidism PAF levels in blood as well as intact PTH (iPTH) and calcium before and 10 days after parathyroidectomy (PTHx) were measured. Native PAF was isolated from the blood, purified by chromatography and high pressure liquid chromatography (HPLC) and quantified by bioassay. iPTH was measured by Allegro RIA and Ca by CIBA-CORNING method. Our results are indicated in the table.

	PAF γ/5ml blood	iPTH	Calcium
Before PTHx	$1.126\times10^{-4} \pm 8.59\times10^{-5}$	876.25 ± 504.7	9.97 ± 0.38
After PTHx	$1.464\times10^{-5} \pm 1.14\times10^{-5}$	121.44 ± 80.1	8.37 ± 0.35
	$0.05 < p < 0.1$	$0.001 < p < 0.01$	$p < 0.001$

In conclusion: 1) PAF levels in blood from HDpts as well as iPTH and calcium are higher before PTHx, 2) Using stepwise regression analysis it seems that PAF depends on calcium which depends mainly on iPTH, 3) The high PAF levels before PTHx probably desensitize the platelet PAF receptors and so decrease the platelet aggregation in vivo in HDpts.

Cascade lipidapheresis as therapeutic modality in the treatment of familiar hypercholesterolemia (FH). *E. Hinari, C. Balodimos, A. Psilopanagiotis, V. Papachristopoulos, D.V. Vlahakos and I.G. Vlachojannis, Division of Nephrology, Patra University Hospital, Patra University School of Medicine, Rio, Greece.* Patients homozygous for FH are often resistant both in dietary modifications and medical therapy and usually succumb prematurely (<30 years of age) from myocardial infarctions. Plasma exchange therapy, as adjunctive therapeutic modality in the treatment of this syndrome was introduced in 1975. Since then, new methods for selective LDL lipidapheresis have been developed and tried. In the present communication, we describe our experience from the use of cascade lipidapheresis, in the treatment of a 24-year-old women with FH. Patient has been noted to have xanthomatosis since the age of 7. Two years ago, she was evaluated at NIH, USA, where she underwent an one-vessel prophylactic coronary bypass and placed on 1 gr probucol and 40 mg lovastatin daily. At the same time, a schedule of biweekly plasma exchange therapy was initiated. Upon return to Greece, one year ago, we created a left forearm fistula and substituted once weekly 3-hour sessions of cascade lipidapheresis for plasma exchange. This method requires two filters: the first filter separates the plasma (Plasmaflo OP-05, Asahi Med. Co, Japan), and the second one depletes it from macromolecules, including lipoproteins (Cascadeflo AC-1770, Asahi Med. Co, Japan). The following table summarizes the variations in metabolic parameters before and immediately after the sessions of cascade lipidapheresis (mean ± SEM):

	Before	After	n	p
Cholesterol (mg/dl)	483 ± 19	213 ± 11	18	***
Triglycerides (mg/dl)	155 ± 23	116 ± 12	18	
LDL (mg/dl)	393 ± 38	177 ± 18	7	**
HDL (mg/dl)	27 ± 3	18 ± 4	7	*
Serum proteins (g/dl)	6.6 ± 0.1	5.1 ± 0.1	18	***
Albumin (g/dl)	4.3 ± 0.1	3.8 ± 0.01	18	**

Despite the initial decline, lipoproteins return to pre-lipidapheresis levels within 4-5 days. By contrast, immunoglobulins, albumin and total serum protein return to normal within 24h. During the past year in our center, the cell blood counts remained normal, the LV function, evaluated by radionuclide scan at rest and after exercise was within the normal limits and achilles tendon diameter, as an index of xanthomatosis, decreased from 3.8 cm to 2.5 cm (measured on CT scan). In conclusion, cascade lipidapheresis appears to be a safe and effective method in the treatment of FH.

The clinical significance of blood urea values and KT/V index in the assessment of the adequacy of hemodialysis. *M. Tjiamalis, G. Metaxatos, Th. Apostolou, A. Gerakis, A. Mantjou, B. Margellos, I. Antonopoulou, K. Katsouri, and A. Billis, Division of Nephrology, Evangelismos Hospital, Athens, Greece.* The adequacy of hemodialysis was prospectively studied in 25 patients (pts), 42 to 73 years old, undergoing

hemodialysis for 8 to 120 (mean 48.7) months. Eighteen pts were anuric and 7 had a residual creatinine clearance of 0.5 to 6.9 ml/min. Dialysis was performed in 4-hour sessions once (1 pt), twice (9 pts) or three times (15 pts) per week. In all pts the following parameters were determined: a) the protein catabolic rate (PCR), b) the time average concentration of blood urea (TAC), c) the KT/V index, d) the per cent reduction of blood urea concentration during hemodialysis (PRU), and e) the correlation between TAC of urea and the mean concentration of pre-and post-dialysis blood urea. The PCR was normal with a mean ± SD of 1.08 ± 0.16 g/kg body wt. The TAC of urea (mean value 125.4 ± 20.6 mg%) was slightly increased (140-150 mg%) in 4 pts and considerably increased (192 mg%) in one pt. In all those 5 pts, modification of dialysis treatment by increase of the weekly sessions of dialysis (3 pts) or change of the dialyser (2 pts) resulted in reduction of TAC of urea to 113-128 mg%. The index KT/V (mean value 0.92 ± 0.19) was normal (>0,90) is 15 pts and low (0.54-0.89) in the remaining 10. The mean PRU was 57.4 ± 8% and showed a very satisfactory correlation with the KT/V index (r = 0.97). Finally, an equally satisfactory correlation was found between TAC of urea and mean concentration of pre-and post-dialysis blood urea (r = 0.95). In conclusion: 1) The determination of the indices of adequacy of hemodialysis contributed to improved treatment in our pts who were receiving inadequate dialysis treatment. 2) Simple measurements, like the mean concentration of pre-and post-dialysis blood urea (as an indirect index of TAC of urea) and the PRU (as an indirect index of KT/V) may be reliable indications for the adequacy of hemodialysis treatment.

Long term changes in tumor markers in chronically hemodialyzed patients. *N. Zerefos, G.E. Digenis, M. Christophoraki, V. Papantoniou, I. Grapsa, P. Rapini, and H. Gyftaki, Hemodialysis Unit and Radio-isotope Section of "Alexandra" Hospital, Athens, Greece.* In order to evaluate the long term changes of the levels of certain tumor markers, [AFP, CEA, CA-125 (ovaries), CA19-9 (pancreas) and CA15-3 (breast)], sera from 12 stable non smoking patients on regular hemodialysis (mean duration 78 ± 6.9 months, x ± SEM) were examined at the beginning of the study (A) and 27 months later (B), by the same radio-immuno assays. None of them showed any signs or symptoms of neoplasia, and pre-dialysis serum creatinine levels remained stable during this period. The comparison was made between the two measurements and a group of 50 normal adults (C).

	AFP (ng/ml)	CEA (ng/ml)	CA19-9 (U/ml)	CA-125 (U/ml)	CA15-3 (U/ml)
C	0.9 ± 0.2	2.2 ± 0.1	15.8 ± 1.0	19.7 ± 1.3	12.8 ± 0.4
A	9.4 ± 0.4	5.9 ± 1.0	10.5 ± 1.3	19.1 ± 3.5	14.7 ± 0.7
B	4.3 ± 1.3	7.2 ± 2.8	26.5 ± 7.0	22.2 ± 2.2	15.1 ± 0.9
p (A-B)	< 0.01	NS	< 0.05	NS	NS

It is obvious that serum levels of AFP were decreased and those of CA19-9 were increased significantly at the end of the study, while the rest tumor markers remained stable. However, these changes did not influence the relation of tumor markers between the hemodialyzed patients and the normal controls. Accordingly, AFP, CEA and CA15-3 had higher levels while CA19-9 and CA-125 remained normal. Conclusions: 1) By the time on hemodialysis there are some changes in serum levels of certain tumor markers. 2) Chronic inflamation of pancreas may be the cause of increased CA19-9 levels.

Prevalence of hepatitis C antibodies (anti-HCV) in renal patients and nursing staff. *A. Gerakis, G. Metaxatos, E. Kapassouri, Th. Apostolou, J. Parasiris, S. Konstantinidis, A. Gjouganatou, V. Spandidakis, and A. Billis, Division of Nephrology and Blood Transfusion Service, Evangelismos Hospital, Athens, Greece.* We have previously reported a high prevalence of anti-HCV not only in hemodialysis patients (pts), but also in those treated in the wards for various nephropathies. Extending these observations we studied the presence of anti-HCV in 324 pts (189 males, 135 females), 16 to 90 years old. Two hundred thirty-six of these pts were hospitalized for various renal diseases, 49 were on hemodialysis (29 permanently dialysed in our unit and 20 regularly dialysed elsewhere but temporarily treated by us) and 39 were on CAPD. We also studied 30 members of the nursing staff (28 females, 2 males), 19 to 52 years old. As a control group were used 4998 apparently healthy blood donors. The determination of anti-HCV was done by enzyme-linked immuno-sorbent assay (ELISA) and all seropositive individuals were rechecked by the recombinant immunoblot assay (RIBA). The percentage of seropositive persons by the ELISA technique was 1.18 in the blood donors, 6.7 in the nursing staff and 9.6 in the total of pts, that is, 7.2% in those treated in the wards, 7.7% in those undergoing CAPD and 22.5% in those on hemodialysis (6.9% in those permanently dialysed in our unit and 45% in those temporarily treated by us). When the seropositive persons were rechequed by the RIBA technique, 51% of the blood donors (30/59) and 55% of the pts (17/31) were found again seropositive. There was no correlation between the presence of anti-HCV and: a) the sex, age or presence of hepatitis B markers among pts and nursing staff, b) the number of blood transfusions, the serum transaminase values and the underlying nephropathy among all pts, and c) the duration of treatment in pts undergoing hemodialysis or CAPD. In conclusion: 1) Compared to the blood donors, anti-HCV were found in six-fold higher percentage in pts treated in the wards for various nephropathies, in those permanently hemodialysed in our unit or undergoing CAPD and in the nursing staff, while the percentage of seropositivity was even higher in pts hemodialysed in other units but temporarily treated by us. 2) Nearly half of the seropositive blood donors and pts were found seronegative when they were rechequed by the RIBA technique.

Hepatitis B, C and D in patients undergoing hemodialysis. *P. Levantakis[2], P. Dimoxenous-Birbiri[3], N Georgilas[1], H. Yousef[1], M. Boukouvala[2], and P. Evangelou[1], Hemodialysis Unit, General Hospital of Veria, Macedonia, Greece[1], Hemodialysis Unit[2] and Blood Transfusion Service[3], General Hospital of Kozani, Macedonia, Greece.* We studied the incidence of the presence of antibodies against hepatitis B, C and D viruses in 98 patients undergoing hemodialysis (63 men and 35 women) and in 37 doctors and nurses in order to derermine the rate of infection of patients and staff by these viruses. The determination of the indices was done using an immunoassay in two time periods (12 months apart) and included HBsAg, HBeAg, anti-Hbs, anti-Hbe and antiHbc for virus B, anti-C for virus C and anti-HD for virus D. The determination of anti-C was done with a second generation EIA and the confirmation of the positive results was done with the EIA supplemental assay (Abbott) and Chiron Riba HCV test of the second generation. Our results showed that during the one-year period the incidence of antibodies against hepatitis B did not change in either patients or staff, with 69.35% of the patients and 83.7% of the staff, having immunity against hepatisis B virus. We also found that 17.35% of the patients and no member of the staff were positive for anti-HCV. None of the typical carriers of HbsAg was positive for HDV. Eleven of the HCV-positive patients were infected by HBV but none of them was a typical carrier of HbsAg. Conclusions: 1) The risk of hepatitis for patients undergoing dialysis has been minimized. 2) The staff of the dialysis units do not have a greater than normal risk of being infected by hepatitis C. 3) Hepatitis D does not seem to be a problem at the present time in hemodialysed patients. 4) The prevalence of hepatitis C seems to be increasing. 5) There was a positive correlation between HCV-positive patients and duration of hemodialysis.

Rapid high efficiency hemodialysis (RHED): One year experience. *K. Sombolos, T. Natse, K. Mavromatidis, N. Zoumbaridis, Chr. Fytili, G. Katsiaris, and A. Karagianni, Renal Unit, General Hospital "G. Papanikolaou" Thessaloniki, Greece.* Rapid (3 hours × 3 times/week) and high efficiency hemodialysis treatment (dialyzers 1.7-2.1 m^2) was provided for one year to 7 chronic hemodialyzed patients (6M, 1F, mean age 52 years) who underwent chronic conventional hemodialysis for a period ranged from 8-75 months (mean 26 months). Dialysis machines equipped with ultrafiltration control system and bicarbonate dialysate (Na 137 mEq/liter, HCO3 39 mEq/liter + 5 mEq/liter acetate) were used. Blood and dialysate flow rates were kept at 400 ml/min and 600 ml/min respectively. BUN, creatinine, K^+, $Ca^{++}$and phosphorus blood levels during the first 6 months of RHED were compared to those obtained during the previous 6 months when the patients

received conventional hemodialysis (4 hours × 3 times/week, dialyzers 1-1.3 m^2, dialysate acetate). Statistically significant difference, ($p = 0.004$), was found only in BUN levels which showed a 14% decline during RHED. The mean value of two measurements of urea (KT/V) during the first 6 months of RHED was found to be 1.24. One patient died during the 7th month of RHED. By the end of the first year the above biochemical parameters did not show any significant difference comparing to those of the first 6 months. It is concluded that RHED is comparable to conventional hemodialysis.

Surgical complications in 410 renal transplantations. *A. Kostakis, G. Sotirchos, St. Kyriakidis, G. Zavos, K. Diles, Chr. Klonaris, A. Sampatakakis, and Gr. Vosnides, Transplantation Center, Laikon General Hospital, Athens, Greece.* From March '83 until November '91, we performed 410 kidney transplantations (227 from living and 183 from cadaveric donors). Six pts received a second graft and another 4 received, simultaneously, a pancreatic graft. Twenty seven pts developed 28 postoperative surgical complications (vascular: 6, graft rupture: 5, lymphocele: 10, ureteric: 7). All vascular complications (1,4%), 3 arterial thromboses, 1 vein thrombosis and 2 aneurysms of the arterial anastomosis – resulted to loss of the graft. All graft ruptures (1,2%) were due to severe acute rejection and were managed with emergency nephrectomy. All pts with lymphocele (2,4%) required surgery following which graft function returned to normal. Graft function also returned to normal following-operation of all ureteric complications (1,7%), ureterocystic fistula: 3 pts, ureteric obstuction: 4 pts. It is concluded that meticulous operative techniques can minimize the surgical complications of kidney transplantation.

Lymphocele: a puzzling complication of renal transplantation. *G. Sotirchos, St. Kyriakidis, Sp. Garbis, G. Zavos, I. Bokos, M. Pappas, Gr. Vosnides, and A. Kostakis, Transplantation Center, Laikon General Hospital, Athens, Greece.* Lymphocele consists a separate clinical entity in kidney transplantation. Of 410 renal transplants (237 from living and 183 from cadaveric donors) performed in our unit between March '83 and November '91, lymphocyle requiring surgery developed in 10 (2,4%). Graft function was significantly impaired in all 10 cases. The diagnosis was made by clinical, radioisotopic and ultrasonographic criteria, while on several occasions puncture of the lymphocele was also required. Transabdominal marsupialization was performed and proved effective in all cases. No recurrence was observed. The post-operative course was normal and graft function returned to normal in all pts apart from one with preexisting chronic rejection who lost his graft several months later. In conclusion, we believe that careful ligation of the lymphatics of both donor and recipient as well as the diminution of some predisposing factors such as steroids, diuretics, anticoagulants, rejection episodes and ureteral obstruction, minimize the risk of developement of lymphocyles, the vast majority of which are treated surgically.

Risk factors in renal retransplantations. *D. Takoudas, A. Antoniadis, A. Papagiannis, D. Gakis, V. Papanikolaou, G. Vergoulas, G. Imvrios, G. Kyriakopoulos, and Z. Polymenidis, Transplantation Surgical Clinic, Histocompatibility Department, Hippokration General Hospital, Thessaloniki, Greece.* The results of kidney retransplantation (RTx) in the cyclosporine era was retrospectively analyzed. During the last decade, 21 out of 284 renal transplantations (Tx) were retransplantations (18 second, 2 third and one fourth RTx). Eighteen patients received cadaver donor grafts while the remaining donations were living related. HLA-DR matching was 2.5 ± 0.7 (r : 1-4). Two patients were retransplanted in the pre-cyclosporine era. In one patient the graft was lost due to nonimmunologic reasons. Eight patients (44%) were highly sensitized (PRA 50-83%). One of them rejected his graft. The follow up ranged from 6 to 79 months. Overall graft survival of the remaining 18 retransplantations was 89% at 1, 2 and 3 years. Acute rejection occurred in 9/18 pts (50%) within 3 months with complete recovery in 7 (77.7%). Two patients rejected their grafts due to acute vascular rejection (accelerated) on the 7th postoperative day. Both of them had rejected their first graft on 10th day and 1 month post Tx. One pt who rejected his second graft on 12th day and 3 pts with primary nonfunction of their first graft had successful retransplantations. In conclusion with the advent of cyclosporine retransplantations can be safely performed. The survival of first grafts and the reasons of their loss seem to influence their outcome. In contrast the PRA levels do not influence their outcome.

Kaposi's sarcoma in renal transplantation. *C. Dioudis, D. Grekas, M. Daniilidis, G. Karkavelas, P. Alivanis, V. Derveniotis, and A. Tourkantonis, First Medical Department, Renal Unit, University Hospital AHEPA, Thessaloniki, Greece.* The appearance of Kaposi's sarcoma after renal transplantation is frequent among Mediterranean people. In the present study we present four cases of Kaposi's sarcoma out of 162 patients who received transplants. There were 3 men and 1 woman aged from 30 to 60 years. The disease was observed to range between 9 months and 125 months after renal transplantation and developed mainly on the upper and lower extremities and the oral mucosa. Two patients were under immunosuppression with CyA + MPZ; one patient received CyA + AZA + MPZ and the last patient AZA + MPZ. The ratio CD_4/CD_8 was lower than 0.9 in 3 patients. Antibodies against HBV, HSV, HIV, CMV, EBV were detected in none of these three patients. One patient had IgG antibodies against CMV and EBV but there was no reactivation. The diminution of immunosuppression in two patients led to regression and in some cases the disappearance of the extensive cutaneous Kaposi's lesions. The patient with the visceral location died six months later and the last patient showed no improvement. Conclusion: Kaposi's sarcoma after renal transplantation is frequent and it is possibly related to overimmunosuppression.

Effect of theophylline on erythrocytosis after renal transplantation. *D. Grekas, C. Dioudis, D. Valkouma, P. Alivanis, V. Derveniotis, and A. Tourkantonis, First Medical Department, Renal Unit, University Hospital AHEPA, Thessaloniki, Greece.* Erythrocytosis occurs in 10-15% of renal transplant recipients, and there is evidence that the production of erythropoietin is modulated by adenosine. We prospectively evaluated the effect of theophylline, a nonselective adenosine antagonist, in eight patients with erythrocytosis after renal transplantation. All patients were given triple drug immunosuppressive therapy with methylprednisolone (8 mg/day), azathioprine (1,5-2 mg/kg body wt daily) and Cyclosporine A (4 mg/kg body wt daily). After an eight-week course of theophylline erythropoietin levels were significantly reduced (from 61 mIU/ml before to 16.5 mIU/ml after treatment, $p < 0.05$). Also, the hematocrits were reduced from 0.59 before to 0.51 after treatment ($p < 0.05$). The previous requirement of monthly phlebotomy was eliminated in all transplant recipients. The above effects were reproducible when the patients were rechallenged with theophylline after a recovery period. It is suggested that theophylline attenuates the production of erythropoietin in patients with erythrocytosis after renal tranplantation and may be useful in the treatment of this condition.

Influenza vaccination in transplants and patients on regular haemodialysis. *D. Grekas, P. Alivanis, V. Kyriazopoulou, C. Dioudis, A. Sioulis, V. Derveniotis, and A. Tourkantonis, First Medical Department, Renal Unit, University Hospital AHEPA, Thessaloniki, Greece.* Since immunosuppressed patients are at higher risk of serious influenza virus infection than healthy subjects we decided to study the effectiveness of influenza vaccination on renal transplant patients, despite the theoretical aspect that such treatment could induce glomerular lesions through an immunological process. Forty transplant patients with satisfactory renal graft function and no febrile episodes, aged from 20 to 50 years were studied. Blood samples were collected before the intramuscular injection of 0.5 ml of multivalent influenza vaccine (Pasteur Merieux Serum Vaccins) and one and two months after the vaccination. Before vaccination the antibody titers to influenza virus ranged from 0 to 1/20 and after vaccination from 1/20 to 1/320. One month after vaccination 17/40 (42.5%), 19/31 (58%) and 16/33 (48%) patients showed a four fold or greater increase of serum influenza antibody titers to antigens A/H_3N_2, A/H_1N_1 and B respectively. A similar response at two months in relation to the first month response rate after vaccination was found in 15/17 (88%), 18/18 (100%), and 15/16 (93%) of transplant patients for the above mentioned three antigens. Side effects observed in two of studied patients. Serum creatinine, urine protein and the rate of acute graft rejection were not changed. It is suggested that influenza vaccination is safe and quite effective in renal transplant patients.

Postoperative complications of the use of peritoneal catheter, Toronto-Western Hospital (TWH) in continuous ambulatory peritoneal dialysis (CAPD). Experience in 130 catheters. *N. Apostolidis, A. Katirtzoglou, A. Manouras, E. Prassa, and Th. Mountokalakis, A' Propaedeutic Surgical Clinic and B' Dept. of Internal Medicine, University of Athens, Medical School, Hippokration Hospital, Athens, Greece.* CAPD is an acceptable method in the management of the end-stage chronic renal failure. Apart from minimal complications this method offers an advantageous long-term approach in the management of these patients. During 1982-1991, 130 TWH catheters were inserted in 115 patients (CRF). The duration of treatment by this method ranged from 1 to 108 months ($\bar{x}$ = 29.5). In most patients the insertion of catheter was done under general anaesthesia. The incisions used were transverse paraumbilical (68 pts), lower midline (45 pts), paramedian (13 pts) and high Roux (4 pts). Early postoperative complications were: peritoneal fluid leaking 12 (9.2%), one way obstruction 2 (1.5%) and evisceration 1 (0.8%). Late complications were: peritoneal fluid leaking 16 (12.3%), herniation 14 (10.8%), tunnel infection 13 (10%), protrusion of cuff 7 (5.4%) and small bowel perforation 1 (0.8%). In conclusion: 1) TWH catheters show minimal postoperative complications. 2) Postoperative herniation depends on the incisional approach, with the transverse paraumbilical one, succeeding better results. 3) Moreover this approach seems to be generally associated with the least postoperative complications.

Early and late function of Tenckhoff catheters placed surgically or by trocar for chronic ambulatory peritoneal dialysis (CAPD). *N. Nikolopoulou, B. Margellos, S. Klimopoulos, Chr. Christodoulidou, A. Gerakis, Th. Apostolou, S. Konstandinidis, K. Ouzounidou, and A. Billis, Division of Nephrology, Evangelismos Hospital, Athens, Greece.* Nonsurgical, by trocar, insertion of the Tenckhoff catheter is simple and if there is enough experience, can be favorably compared to the surgical technique. However, very few studies have compared the use of both techniques by the same center. We studied therefore, the early and late results of these techniques in 135 consecutive patients (pts) (83 males, 52 females), 14 to 82 years old, who were started on CAPD during an 8-year period. In 85 pts, the catheter was surgically placed (group I) and in the remaining 50 pts, it was inserted by trocar (group II). In all pts a straight radio-opaque catheter with two dacron cuffs was used. Surgical placement was done by midline incision under local anesthesia, while the insertion by trocar was done also in the midline 2 cm below the umbilicus. The two groups of pts were comparable in sex, age, primary renal disease and mean follow-up period which was 32.6 months for group I and 29.9 months for group II. The main early complication was leakage of the dialysate which occured in 13.1% of pts in group I and in 3.6% of those in group II and was treated conservatively in all pts. The most common late complications in pts of group I were hernias, infections of the exit-site or the subcutaneous tunnel and replacement of the catheter due to obstruction or migration (p = NS), while in pts of group II not a single case of hernia at the insertion site of the catheter was observed. The number of episodes of peritonitis/pt/year was equal (0.63) in both groups. The cummulative functional survival of the catheter at 5 years was 84% for group I and 70.6% for group II. In conclusion, Tenckhoff catheters which were placed in our pts either surgically or by trocar, showed a satisfactory early and late function, but the insertion by trocar resulted in a smaller percentage of early (leakage of dialysate) and late (hernias) complications.

Removal of Tenkchoff catheter and immediate placement of a new one in patients with persisting or recurring peritonitis undergoing CAPD. *D. Hadjiyannakos, N. Nikolopoulou, B. Margellos, G. Metaxatos, A. Gerakis, D. Georgakopoulou, M. Giamalis, Chr. Kaninis, and A. Billis, Division of Nephrology, Evangelismos Hospital, Athens, Greece.* For the treatment of persisting or recurring microbial peritonitis in patients (pts) on CAPD, Tenckhoff catheter is usually removed, the pt is temporarily transfered to hemodialysis and, after the control of the infection, a new catheter is inserted. However, certain authors have reported a successful treatment of peritonitis by removal of the catheter and immediate placement of a new one. We used this technique in 7 pts, 38 to 65 years old, with refractory to treatment (3 pts) or recurring (4 pts) peritonitis. Patients who were submitted to catheter replacement for peritonitis, but also presented with infection of the exit site and/or of the subcutaneous tunnel, were excluded from the study. The peritoneal fluid cultures, which were taken before the removal of the catheter, showed staphylococcus (aureus 2 pts, epidermidis 1 pt), pseudomonas (1 pt) and acinetobacter (1 pt), while in 2 pts were sterile. The removal of the catheter and the placement of a new one, were performed sequentially at the same time so that peritoneal dialysis was uninterrupted, allowing also the intraperitoneal administration of antibiotic drugs. Following replacement of the catheter, resolution of peritonitis was achieved in all pts and the peritoneal fluid cultures became negative. During the follow-up period, which ranged from 3 to 31 months, there were only 3 episodes of peritonitis in three pts which occurred 6, 16 and 27 months after replacement of the catheter. In conclusion, in cases of persisting or recurring peritonitis, the removal of Tenckhoff catheter and the immediate placement of a new one is an effective therapeutic approach which also obviates the need of an additional intervention for insertion of the catheter and of temporary transfer of patient to hemodialysis.

Sclerosing peritonitis in patients on continuous ambulatory peritoneal dialysis (CAPD). *B. Margellos, N. Nikolopoulou, S. Klimopoulos, D. Georgakopoulou, G. Metaxatos, T. Apostolou, C. Christodoulidou, D. Hadjiyannakos, and A. Billis, Division of Nephrology, Evangelismos Hospital, Athens, Greece.* Sclerosing peritonitis (SP) is the most serious late complication of CAPD and its incidence, clinical manifestations and mortality vary widely in the literature. We studied retrospectively 11 patients (pts) 34 to 63 years old, who developed this complication and accounted for 8% of all pts who were started on CAPD during a 7-year period. The primary renal disease was chronic interstitial nephritis (5 pts), glomerulonephritis (3 pts), malignant hypertension (1 pt)and unknown (2 pts). Lactate solutions were used in 6 pts and acetate in 5 pts. The incidence of episodes of peritonitis in those pts (1/14.3 months/pt) did not differ significantly from that of the other CAPD pts (1/19.5 months/pt, $p > 0.05$). Eight pts received aminoglycosides intraperitoneally. The main clinical manifestations were progressive loss of ultrafiltration (8 pts), recurrent episodes of obstructive ileus (5 pts), persistent vomiting (3 pts), progressive cachexia (3 pts), diarrhea (3 pts) and ascites (2 pts) and all of them appeared 6-88 months after the initiation of CAPD. All pts were treated by laparotomy (9 of them while they were on CAPD and 2 after they had been transfered to hemodialysis) during which lysis of adhesions (2 pts), with (5 pts) or without (2 pts) placement of a new catheter and removal of the catheter (4 pts) was performed. At the end of the follow-up period (November 1991) 6 pts were still on dialysis (hemodialysis 3, CAPD 3), 1 to 50 months after the diagnosis of SP, 1 pt had a successful renal tranplantation and 4 pts had died (two postoperatively and two 45 and 51 months after the diagnosis of SP). In conclusion: 1) The incidence and mortality of SP in our pts were among the lowest reported in the literature. 2) We believe that prompt surgical treatment was most important for their survival and allowed the continuation of CAPD in some of them.